DVD Studio Pro 4

User Manual

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Welcome to DVD Studio Pro

DVD Studio Pro is software for authoring DVD-Video titles. It is both powerful and easy to use.

This preface covers the following:

- About DVD Studio Pro (p. 11)
- About DVD Studio Pro Documentation (p. 11)
- Additional Resources (p. 11)

About DVD Studio Pro

DVD Studio Pro lets you work with audio, video, graphics, and text materials that you have already created and edited and orchestrate them into a DVD that can be played on a DVD player or a suitably equipped computer.

If you have used such production tools as Final Cut Pro, Adobe Photoshop, Media 100, or Discreet cleaner, DVD Studio Pro will be easy for you to learn. You can use DVD Studio Pro for everything from constructing sophisticated training materials, corporate presentations, sales tools with web links, or high-quality event videos, to preparing a motion picture for release on DVD.

About DVD Studio Pro Documentation

DVD Studio Pro comes with documentation that will help you get started as well as provide detailed information about the application.

- *DVD Studio Pro User Manual:* This is a comprehensive document that describes the DVD Studio Pro interface, commands, and menus, and gives step-by-step instructions for creating DVD Studio Pro projects and for accomplishing specific tasks. It is written for users of all levels of experience.

Additional Resources

Along with the documentation that comes with DVD Studio Pro, there are a variety of other resources you can use to find out more about the application.

DVD Studio Pro Website

For general information and updates, as well as the latest news on DVD Studio Pro, go to:

- http://www.apple.com/finalcutstudio/dvdstudiopro

Apple Service and Support Websites

For software updates and answers to the most frequently asked questions for all Apple products, go to the general Apple Support web page. You'll also have access to product specifications, reference documentation, and Apple and third-party product technical articles.

- http://www.apple.com/support

For software updates, documentation, discussion forums, and answers to the most frequently asked questions for DVD Studio Pro, go to:

- http://www.apple.com/support/dvdstudiopro

For discussions forums for all Apple products from around the world, where you can search for an answer, post your question, or answer other users' questions, go to:

- http://discussions.apple.com

Overview of Using DVD Studio Pro

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DVD Studio Pro plays a key part in delivering your video projects to your viewers. This chapter covers many of the basics you need to know about to author and burn successful DVDs.

This chapter covers the following:

- Moving from iDVD to DVD Studio Pro (p. 13)
- About Standard and High Definition DVDs (p. 14)
- About DVD Studio Pro and HD Resolution DVDs (p. 15)
- HD Video Assets (p. 17)
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Moving from iDVD to DVD Studio Pro

The Apple entry-level DVD authoring application is iDVD. It allows you to create simple DVD-Video titles with some of the most popular features found in Hollywood-style releases, without having to know any technical details about the process. The interface and feature set are configured to make the process nearly foolproof.

Eventually, however, you will find yourself requiring features beyond those that iDVD offers. DVD Studio Pro gives you access to a wide range of professional features outlined in the DVD specification:

- Support for multiple video, audio, and subtitle streams, making it easy to create discs that support multiple languages or add features such as a director's commentary

- Additional menu functionality. For example, you can create and add up to 36 buttons, control the navigation between them, and have more flexibility when assigning their functions.
- Alternate ways to play back movies. You can use the DVD Studio Pro story feature to control how a movie plays.
- Support for web interactivity. You can embed links to websites or other documents into your DVD title.
- Many advanced features supported by the DVD specification, such as dual-layer discs and copy protection

DVD Studio Pro offers several workflows and work styles for creating DVD projects, including templates and the drag-and-drop method used within iDVD. This makes DVD Studio Pro easy to learn while still providing the advanced features you need.

About Standard and High Definition DVDs

Standard definition (SD) DVDs provided most viewers with their first digital video experience. The great video quality, interactive menus, and surround sound audio found on current DVDs set a high standard for viewer expectations. Meanwhile, the establishment of high definition (HD) video format standards and the increasing availability of HD broadcasts have led to more and more viewers having HD video monitors, and even higher expectations for DVDs.

These expectations, along with the development of improved compression technologies and a blue laser technology that greatly increases a disc's storage capacity, have led to the ability of recording HD video onto a DVD.

But Aren't DVDs Already High Definition?

In addition to traditional 4:3 aspect ratio video, traditional DVDs support widescreen 16:9 video, which is often mistaken for being high definition. The 16:9 video used on current DVDs, however, is the same resolution as the 4:3 video, which is the same as the standard NTSC and PAL broadcast resolutions. The 16:9 video must be anamorphic, which makes it appear horizontally squashed when viewed on a 4:3 monitor.

This leads to a logical next question—what constitutes high definition video? While most HD video formats use a 16:9 aspect ratio, what generally defines whether or not they are HD is the resolution.

Video resolutions that result in more pixels per frame than are used in SD-based DVDs are considered high definition. There are two common HD vertical resolutions: 720 lines and 1080 lines (used for both NTSC and PAL). These compare to NTSC's 480 lines and PAL's 576 lines for SD video.

As with SD-based DVDs, the scanning method used on HD-based DVDs can be interlaced, with a video frame containing one field with the odd lines and another field with the even lines, or progressive, where each frame is complete. Not all HD formats support progressive scanning, however. See Supported Video Resolutions for details on supported SD and HD video formats, including frame rates and scanning methods.

See About DVD Studio Pro and HD Resolution DVDs and HD Video Assets for more information about creating HD projects in DVD Studio Pro.

About DVD Studio Pro and HD Resolution DVDs

In addition to supporting standard definition (SD) format video DVDs, DVD Studio Pro supports creating high definition (HD) format video DVDs.

With the exception of support for HD video resolutions and the number of buttons on menus and button over video subtitles, HD projects in DVD Studio Pro have the same limits as SD projects.

There are two aspects to creating DVDs with HD content: what you can put into the DVD video zone and the DVD disc media.

DVD Video Zone with HD Content

While the contents of the DVD video zone for an HD-based DVD (HVDVD_TS) are similar to those of an SD-based DVD video zone (VIDEO_TS), there are some important differences:

- HD-based DVDs support a broad range of video resolutions, including most of those used in SD-based DVDs. See Supported Video Resolutions for a complete list of supported resolutions.

- In addition to supporting SD MPEG-2 video encodes, HD-based DVDs support HD MPEG-2 and H.264 video encodes. These are discussed in HD Video Assets.

Blue Laser Disc Media

Due to the improved video resolution possible with HD video, the encoded video files for HD resolution DVDs can be larger than those used with SD resolution DVDs. For that reason, a media format based on a blue laser was designed specifically for DVD projects containing HD video. See the following table for a comparison of SD and HD disc sizes.

Disc	Red laser capacity	Blue laser capacity
Single-sided, single-layer	4.7 GB	15 GB
Single-sided, dual-layer	8.54 GB	30 GB

In addition to blue laser based DVD media, an HD project's DVD video zone can be written to DVD media based on the red lasers used by traditional DVDs. (The obvious limitation is that you will not be able to fit as much video data on the disc.)

Important: SD-based DVD players are not able to play DVD projects containing HD content, whether they are on red or blue laser media. Additionally, only HD projects on special 3x DVD-ROM red laser media are officially supported in the HD DVD specification. You can burn HD projects to traditional red laser media on your system; however, the discs might not play in all HD DVD players.

Supported Video Resolutions

All video resolutions supported by SD-based DVDs are also supported by HD-based DVDs. This means that an HD-based DVD can use an HD video resolution for the main feature, then use an SD video resolution for extras. The following list includes the SD and HD video resolutions supported by DVD Studio Pro.

Note: MPEG-1 encoded video files are not supported in HD projects.

NTSC

Frame rates with an "i" indicate the interlaced scanning method; those with a "p" indicate the progressive scanning method.

Resolution	Frame rate	Aspect ratio	Notes
352 x 240	29.97i	4:3	Also known as SIF format
352 x 480	29.97i	4:3	Also known as 1/2 D1
704 x 480	29.97i	4:3, 16:9	Also known as Cropped D1; 16:9 is anamorphic
720 x 480	29.97i	4:3, 16:9	Also known as Full D1; 16:9 is anamorphic
720 x 480	59.94p	16:9	HD only, also known as 480p; is anamorphic
1280 x 720	59.94p	16:9	HD only, also known as 720p
1440 x 1080	29.97i	16:9	HD only; 16:9 is anamorphic

Resolution	Frame rate	Aspect ratio	Notes
1920 x 1080	29.97i	16:9	HD only, also known as 1080i

PAL

Frame rates with an "i" indicate the interlaced scanning method; those with a "p" indicate the progressive scanning method.

Resolution	Frame rate	Aspect ratio	Notes
352 x 288	25i	4:3	Also known as SIF format
352 x 576	25i	4:3	Also known as 1/2 D1
704 x 576	25i	4:3, 16:9	Also known as Cropped D1; 16:9 is anamorphic
720 x 576	25i	4:3, 16:9	Also known as Full D1; 16:9 is anamorphic
720 x 576	50p	16:9	HD only, also known as 576p; is anamorphic
1280 x 720	50p	16:9	HD only, also known as 720p
1440 x 1080	25i	16:9	HD only; 16:9 is anamorphic
1920 x 1080	25i	16:9	HD only, also known as 1080i

Using 24P Video Formats

Both SD and HD projects can use assets encoded at 24 fps, as long as they are encoded specifically with NTSC or PAL flags set.

Note: For NTSC, 24 fps is actually 23.976 fps, although it is most often referred to as 23.98 fps

Video at 24 fps has two main advantages: it matches the film frame rate, and, in the case of NTSC, provides much smaller files due to having six fewer frames per second.

See Importing 24 fps Assets for more information.

HD Video Assets

There are a variety of sources for HD video assets to use in your HD projects, with the most common being DVCPRO HD and HDV camcorders.

- With DVCPRO HD, once you have finished editing the video, the result will need to be encoded to the HD MPEG-2 or H.264 video format.
- With HDV, which is already compliant MPEG-2 HD video, you can edit the video in Final Cut Pro and import the result directly in your HD projects.

DVD Studio Pro supports HD video encoded using the HD MPEG-2 codec and the H.264 codec. Both of these formats are playable with the Apple DVD Player. You can use Compressor to encode video to either of these formats. When you import HD resolution QuickTime video, such as DVCPRO HD video, into DVD Studio Pro, it is HD MPEG-2 encoded using the integrated MPEG encoder.

Using HDV Assets

The HDV format uses MPEG-2 encoding to store HD video on a standard DV or Mini DV tape. Two video resolutions supported by the HDV format:

- 1280 x 720 (720p) at 19 Mbps
- 1440 x 1080 (1080i or 1080p) at 25 Mbps (which is anamorphic 16:9)

Imported HDV assets have the video and audio separated into elementary streams (the HDV format combines the video and audio into a single file), but are not otherwise processed or converted.

Important: The HD DVD specification does not support all HDV frame rates. See About HDV Video for more information.

Using H.264 Assets

You can use the H.264 for HD DVD presets included with Compressor to encode several supported HD and SD video resolutions for use in your HD projects.

The H.264 encoder is twice as efficient as the standard MPEG-2 encoder. When compared to encoding with MPEG-2, this means that with the H.264 encoder:

- You can use a lower bit rate to get the same quality, resulting in smaller files.
- You can use the same bit rate and get better quality with the same file size.

See About H.264 Video for more information.

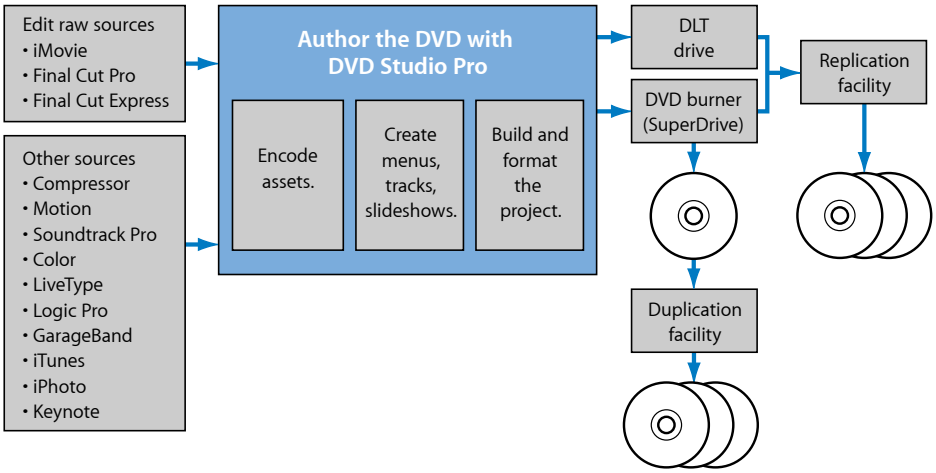
Using DVCPRO HD and Uncompressed HD Assets

Another source of HD assets for your HD projects is video encoded with the DVCPRO HD compression types or uncompressed video. DVCPRO HD video, like DVCPRO SD video, and uncompressed video cannot be used directly in your DVD Studio Pro projects. You can import them, however, and DVD Studio Pro will automatically encode them to compatible HD MPEG-2 assets using the integrated MPEG encoder. You can also encode them to HD MPEG-2 or H.264 using Compressor or QuickTime.

Note: Using the Animation codec with HD resolution video can significantly reduce your computer's performance and should be avoided if possible. An alternative is to use the Apple Intermediate Codec.

Brief Overview of the DVD Creation Process

You can create many different styles of DVDs with DVD Studio Pro, from corporate presentations to training materials to event videos to feature films. While the content and structure of each style may vary considerably, they all use the same basic DVD creation process.



There are four stages to the DVD creation process:

Stage 1: Creating Your Source Material
The first part of the DVD creation process is to create or assemble your source material. See Creating Source Material for more information.

Stage 2: Encoding Audio and Video to Compatible Formats
Once you have created your source materials, they must be encoded to comply with the DVD specification. See Encoding Video and Audio for more information.

Stage 3: Authoring Your DVD Title
You use DVD Studio Pro to orchestrate your video, audio, and graphics material into an interactive DVD-Video title, complete with menus, buttons, subtitles, and alternate languages or soundtracks. See Authoring with DVD Studio Pro for more information.

Stage 4: Building the Project and Creating Your Disc
Creating a disc involves two steps: building the DVD-formatted video zone and formatting it for how you intend to deliver it. See Creating a Disc for more information.

It's important to understand the entire process, and how DVD Studio Pro is used in the process, before you begin your DVD projects.

Creating Source Material

The first part of the DVD creation process is to create or assemble your source material. This might mean shooting video, recording voice or music tracks, designing graphics to be included, and planning the general functionality of your project. If you are converting an existing video program into a DVD, you may only need to gather your original video and audio material and design graphics for the menus that will weave them together.

You can use whatever tools you prefer for creating your video and audio material, as long as the resulting files are compatible with the MPEG or H.264 encoder that you plan to use. In most cases, your video and audio assets will be created and saved as QuickTime movie files or in standard sound file formats like AIFF, WAVE, or SoundDesigner II.

Your program material should be completely edited, including any special effects, audio fades, and scene transitions, before you encode it.

Menu graphics can be still image files, multilayer Photoshop files, or full-motion video. To create the menu graphics, you can use virtually any graphics program. DVD Studio Pro includes extra support for Adobe Photoshop (PSD) files, taking advantage of Photoshop's "layers" feature to simplify the creation of backgrounds and overlays. Also included is support for the menu loop point you can set in Motion.

If you plan to include alternate-language subtitles in your DVD project, you will want to have your soundtrack transcribed and translated.

The most important thing you can do when preparing your assets is to use the highest-quality settings available. Any flaws in your material will be revealed on DVD much more quickly than in any other medium.

Once they are encoded into a DVD-compliant format, DVD Studio Pro does not improve or degrade the quality of your source material in any way; if you use high-quality source materials, you'll get high-quality results.

Here are some guidelines to help you maintain high quality.

- Capture and edit your video material at the same resolution that you will use on the DVD (typically 720 x 480 at 29.97 frames per second [fps] for NTSC or 720 x 576 at 25 fps for PAL for SD-based DVDs).
- When recording and editing audio, use a 48 kilohertz (kHz) sample rate and no compression. This assures the best quality whether you use the uncompressed audio on the DVD or decide to use the Compressor AC-3 encoder to compress it.

  Important: When creating DVDs, your audio must have either a 48 kHz or 96 kHz sample rate. You cannot use the 44.1 kHz sample rate found on standard audio CDs. In most cases, the DVD Studio Pro embedded AIFF encoder will convert your audio to the correct sample rate if necessary.

- When saving video material to the QuickTime format, either specify no compression (which requires a lot of disk space) or use a high-quality compression codec like DV or Motion JPEG.

Encoding Video and Audio

Once you have created your source materials, they must be encoded to comply with the DVD specification. DVD Studio Pro can use materials encoded using its integrated MPEG and AIFF encoders, as well as materials encoded using the Apple Compressor application and other methods.

What Is Needed for DVD?

Before video or audio material can be used on a DVD, it must be prepared in one of the formats defined in the DVD specification. This usually means MPEG-2 format for video and Dolby AC-3 format for audio files (although you can also use standard PCM audio formats, such as AIFF files, DTS format files, and MPEG-1 Layer 2 formatted files).

SD projects also accept the older MPEG-1 video format, most commonly seen in web-based applications. Because MPEG-1 is about one quarter the resolution of MPEG-2 (352 x 240 as opposed to 720 x 480 for NTSC or 352 x 288 versus 720 x 576 for PAL) and utilizes much lower data rates, the quality is significantly lower. However, MPEG-1 is useful for very long programs if the picture quality is not of primary importance. Using MPEG-1 encoding, you can fit many hours of material on a single DVD.

Important: You cannot use MPEG-1 formatted video assets in HD projects.

MPEG encoding performs extremely complex calculations on your source material to determine what can be safely "thrown away" with minimal impact on the visual quality. As a result, MPEG encoding can produce files that are less than ten percent the size of the source files, while still looking great.

Using the DVD Studio Pro Tools

DVD Studio Pro includes integrated MPEG and AIFF encoders. When you add a QuickTime asset directly to your DVD Studio Pro project, it is automatically encoded to be DVD-compliant. You can choose whether the asset is encoded in the background while you continue authoring or whether the encode waits until you build your project.

Also included with Final Cut Studio is Compressor, an encoding tool that provides additional MPEG encoding configurations and can process batches of video and audio clips in one step.

For many projects you will probably want to use a Dolby-certified AC-3 encoder (such as the AC-3 encoder included with Compressor). An AC-3 encoder can be used to encode multichannel surround soundtracks for inclusion on a DVD, as well as for stereo or mono soundtracks. Using AC-3 encoded audio results in smaller files and a lower playback bit rate. Uncompressed PCM audio formats (WAV or AIFF) have significantly larger file sizes and generally do not support specialized soundtrack formats, such as surround channels.

Using Pre-Encoded Sources

Many other available tools, including software and hardware encoders, produce MPEG streams. You can use any MPEG encoder you prefer, as long as it creates DVD-compliant elementary streams. This means that the audio and video information is contained in separate files (the streams).

Important: DVD Studio Pro cannot use MPEG multiplexed System, Program, or Transport streams for DVD projects.

See About MPEG Video for more information on DVD-compliant requirements.

Authoring with DVD Studio Pro

You use DVD Studio Pro to orchestrate your video, audio, and graphics material into an interactive DVD-Video title, complete with menus, buttons, subtitles, and alternate languages or soundtracks.

DVD Studio Pro gives you complete control over every aspect of your DVD and lets you view its elements and simulate your DVD in real time as you create it.

You can easily create menus, add buttons, and specify the actions that occur when the buttons are activated. You can define powerful linking and scripting functionality with just a few clicks. And the Inspector gives you a complete picture of all the characteristics of any item in your project.

Authoring in DVD Studio Pro consists of these basic steps:

Stage 1: Setting the DVD and Video Standard

You can use DVD Studio Pro to author traditional SD-based DVDs or HD-based DVDs using either NTSC or PAL frame rates. It is important to set this before importing your assets because these settings control what happens when QuickTime assets are imported.

Stage 2: Importing Assets

Import your video, audio, graphics, and subtitle assets into DVD Studio Pro. If they are not already DVD-compliant, the integrated MPEG encoder automatically encodes them.

Stage 3: Creating Menus

Create one or more menus to define the structure and navigation of your DVD. The menus can rely completely on the supplied templates and styles or can use your own graphics.

Stage 4: Adding Buttons to the Menus
Add one or more buttons to your menus. The display mode (4:3, 16:9 Letterbox, and so on) and DVD standard (SD DVD or HD DVD) determine the maximum number of buttons each menu can have. Each button can initiate a wide variety of actions, the most common being to open a different menu, play a track, or run a script. This hierarchy of menus and buttons gives you tremendous flexibility in constructing an "interactive" program in which the viewer has numerous options to choose from.

Stage 5: Creating Tracks and Slideshows
Create one or more tracks, each consisting of one or more video streams, audio streams, subtitle streams, chapter markers, and stories. Create one or more slideshows, each consisting of still images and, optionally, audio. Tracks and slideshows can also be created by dragging assets to the Menu Editor and choosing options from the Drop Palette.

Stage 6: Linking the Project Elements
Set up the various actions and links that will make your project work as it should when viewed. For example, you can set what happens when a DVD player first starts playing the disc, what happens when a track finishes playing, and what happens if the player sits idle at a menu for a specific amount of time.

Stage 7: Simulating Your Project
View your elements and test your project as you go using the real-time DVD Simulator built in to DVD Studio Pro. This process allows you to verify the links between the project elements.

Stage 8: Building and Burning Your Project
Build the completed project and either send it to a replication facility or burn a DVD on your own system.

Creating a Disc

Creating a disc involves two steps: building the DVD-formatted video zone (VIDEO_TS for SD-based DVDs and HVDVD_TS for HD-based DVDs) and formatting it for how you intend to deliver it.

Building the Video Zone

When you build your SD-based DVD project, a set of files is created and stored on your hard disk in a folder named "VIDEO_TS" (video title set). The contents and structure of this folder are strictly defined by the DVD specification. HD projects store their files in a folder named "HVDVD_TS."

When you build your project within DVD Studio Pro, it combines all the material you've included (video, audio, and subtitles for the menus and tracks) into a single stream and writes it to this special folder. Using DVD Player, which is included with your operating system, you can open and play the contents of this folder, just as if it were on a DVD disc.

Formatting and Burning

Depending on the quantity of DVD discs you need, you can:

- *Burn one or more DVDs on your system (if properly equipped):* This is a quick way to create a test disc.

  Note: You cannot add high-end features such as copy protection.

- *Send a burned disc to a duplicator who can burn additional copies for you:* This allows you to create more discs than you would want to burn on your own system at a lower cost than using a replicator. Because the copies are based on a disc you burn on your system, the duplicated discs have the same restrictions as when you burn on your system.
- *Prepare suitable files to send to a DVD replication facility:* Use a replicator to make copies that are compatible with all DVD players, to create larger quantities of discs, and to include specialized features not supported by your system's DVD burner.

If you are using a DVD replication facility, you can deliver your project to the facility in several ways:

- *DLT:* Digital Linear Tape (DLT) is the preferred method for sending an SD DVD project to a DVD replication facility. DVD Studio Pro supports writing directly to a DLT drive. DLT is well suited to transporting DVD projects because of its reliability and very high capacity.

  Important: You cannot write HD DVD projects to a DLT drive.

- *Burned DVD:* Many DVD replicators accept DVD discs that you've burned on your system for replication. There are special requirements if you want to include high-end features such as dual-layer and copy protection. See DVD Burners for more information on using burned DVD discs for replication, including information about the Cutting Master Format (CMF).
- *Hard Disk:* You can format your SD or HD project to an external hard disk and send the hard disk to your replicator. By selecting a CMF or DDP format, you can also include advanced features such as copy protection. This method works especially well for large HD projects.
- *Electronic Copy:* Some replicators have provisions that allow you to transfer the project's build files directly to their server using the Internet.

See Output Devices for information on using these methods for delivering projects to replicators.

What Makes a DVD Authoring System?

The DVD Studio Pro installation booklet lists the minimum hardware and software requirements for using DVD Studio Pro to build DVD titles. However, you may find you need additional items beyond the minimum requirements to make up your DVD authoring system. Depending on the types of DVD titles you intend to create, your DVD authoring system can be an off-the-shelf Mac Pro with a SuperDrive or a specialized system with additional drives and hardware.

See the following for more information:

- Hard Disk Storage
- SCSI Devices
- DVD Burners
- DLT Drives
- External Video and Audio Monitoring

Hard Disk Storage

No matter what sort of titles you intend to create, you will be working with very large files.

You should have at least twice as much hard disk storage space as the size of your project. (For DVD-5, for example, which can hold about 4.4 GB, you need 4.4 GB for the MPEG-2 encoded asset files and another 4.4 GB to hold the built, or compiled, project. An HD project can require about 60 GB to hold the asset and built project. Original asset files, such as DV format video, require much more space than the MPEG-2 encoded versions used in your DVD project.) For best build performance, dedicate two or three Ultra Wide A/V or FireWire hard disks to your project. (Make sure they contain only your media and no other programs that might fragment the disk and decrease performance.) If you have three disks, use one for video assets, one for audio assets, and the third for the finished files. If you have two disks, use one for source assets and one for final files.

SCSI Devices

Depending on your needs, you may need to add external devices—such as hard disks and DLT drives—that require SCSI support.

To use SCSI devices, you must either have your Mac properly equipped when ordering it or add a third-party SCSI PCI card to your existing desktop computer. Contact your Apple Authorized Reseller or see the Support area of the Apple website for a list of suggested SCSI cards and devices.

DVD Burners

Being able to burn a DVD is useful for both proofing your titles on set-top DVD players and burning the finished project (when only a small number of discs are required). You can also burn a disc for a duplication or replication facility to use as a master when larger quantities are needed.

You cannot burn discs that support Macrovision copy-protection or Content Scrambling System (CSS) encryption. These must be created at a replication facility.

Note: For best results, it is recommended that you supply the replication facility with a DLT tape or hard disk instead of a burned DVD disc. Be sure to confirm with the facility what formats it supports.

Choosing a DVD Burner

When choosing a DVD burner for your system, you have the option of using an Apple SuperDrive or other drives. Your choice depends in part on which media you want to use: whether you intend to burn on red laser or blue laser media and, in the case of red laser burners, whether to use general or authoring media.

Note: You cannot burn SD projects to blue laser media.

General Versus Authoring Media

The first drives created to write DVD-R discs used a special red laser and expensive media and are known as *authoring media* drives. The most common DVD drives, however, use a less expensive red laser and media. Such drives are known as *general media* drives.

Red laser DVD drives can write to either general or authoring media—not both. The SuperDrive supplied with many Apple systems supports only general media. To use authoring media, you need to connect a special DVD-R drive.

Important: Be sure you write only to media supported by your drive. If the media is not labeled either *general* or *authoring*, it was likely manufactured before the existence of general drives and can be assumed to be authoring-compatible.

The type of media you use only affects the writing of the disc. Both types of DVD drives and most DVD-ROM drives and set-top DVD players can read and play both general and authoring media.

For most projects, there is no significant difference between a DVD created using general or authoring drives and discs. However, if you intend to use a replicator and require high-end features such as Macrovision copy-protection and CSS data encryption, you must use authoring media with an authoring drive.

Even with authoring media, you cannot burn a DVD that supports any of these high-end features on your own system. However, authoring media supports the Cutting Master Format (CMF), which can be used to add information required by the replicator to put these features on your discs. General media does not support CMF.

See The Cutting Master Format for more information on the CMF standard.

An Alternative Way to Use General Media

While you cannot use the CMF format directly on general media discs, you can still use general media discs to deliver DVD projects with high-end features to your replicator by using them as data discs. In general, you format your project to your hard disk using a CMF or DDP format. You can then copy the resultant Layer 0 and Layer 1 folders to your DVD media (each layer to its own disc). While these discs are not DVD-Video discs and cannot be played in a DVD player, they do contain all the information the replicator needs to create the final discs. See Output Devices for more information about formatting to your hard disk.

Important: Be sure to check with your replicator before making the discs.

About the Different Types of General DVD Media

There are several types of DVD media available that DVD Studio Pro can use. The type you should use depends on your requirements. For example,

- *If playback compatibility is a primary concern:* Burning discs that can be played back on most set-top DVD players is often a high priority. Several variables affect this, including the media type, the brand of media, and the DVD player itself. In general, newer DVD players can play a wider variety of media types; however, there are exceptions to this. You should always test your burned DVDs on a variety of DVD players to verify compatibility.
- *If rewritable media is more efficient for you:* Using rewritable DVD media can be very useful when you want to burn a test disc of a project to verify various aspects of it. For example, you might want to burn a disc just to verify that a menu or script works correctly on a set-top DVD player or to see the video quality of a clip on a variety of external monitors. Being able to make a change to the project and then reuse the disc to burn it saves having to use a new disc each time.
- *If you need to burn a dual-layer project:* Being able to burn a dual-layer project to a DVD disc can be very useful. You should be aware, though, that there are big differences between DVD+R double-layer and DVD-R dual-layer media.

Following is some general information on the types of media you are able to choose from.

DVD-R and DVD+R

These are “write-once” discs that tend to be the most widely compatible with DVD players.

DVD-RW and DVD+RW

These rewritable discs can be erased and reused multiple times. While they cost a bit more than "write-once" discs, the ability to use them multiple times to verify various aspects of your project as you work on it can be very useful. However, rewritable discs tend to not be as compatible with DVD players as "write-once" discs.

When you use DVD-RW and DVD+RW media, DVD Studio Pro first checks to see if the disc contains any files. If it is empty, the format proceeds. If there are files on the disc, an alert appears warning you that the disc will be erased if the format continues—you can then continue or cancel the format process.

DVD+R Double-Layer

You can use DVD+R double-layer media, often referred to as DVD+R DL, for burning your dual-layer projects. With DVD+R double-layer media, DVD Studio Pro places the layer break point and sets the switch point to be nonseamless as specified in your project.

DVD+R double-layer discs require you to use the Opposite Track Path (OTP) direction setting when burning the disc. This means that the first layer must be larger than the second layer. See Setting the Dual-Layer Direction for more information.

While DVD+R double-layer discs allow you to burn your dual-layer projects, they tend to have more compatibility issues than the other types of DVD media.

DVD-R Dual-Layer

If your system contains a DVD drive that can write to the new DVD-R dual-layer media, you can burn your DVD project to it with DVD Studio Pro. However, there are several issues:

- Because currently DVD Studio Pro has no way to identify DVD-R dual-layer media as having two layers, burning a dual-layer project to it results in the appearance of an alert message telling you that the DVD media may have insufficient room to hold the project. This message is based on the assumption that the disc is single layer. Both layers of the disc will be written to as needed, however, when you click Continue.
- If you are burning a dual-layer project, the break point you set will not affect where the layer break actually occurs. Instead, the first layer is written to until filled, at which point the drive switches to writing to the second layer.
- The switch between layers is a seamless layer change not supported by some DVD players, which may stop playing the disc when the switch point is reached.

Important: Do not use DVD-R dual-layer media unless these issues do not impact your project.

Determining Which Media Types Your DVD Drive Supports

Before using any of the media types described in About the Different Types of General DVD Media, you should verify that your DVD drive supports that type.

To verify the media types supported by your DVD drive

1. Choose Apple menu > About This Mac.
2. Click the More Info button in the About This Mac window.
3. Click the disclosure triangle next to Hardware to show the list of hardware devices.
4. Select the Disc Burning item in the hardware list.

   The DVD-Write line that appears in the information pane lists the supported media types.

DLT Drives

Digital Linear Tape (DLT) drives are the most reliable way to deliver SD DVD content to a replicator. They are also a good way to back up completed projects so that you can remove them from your hard disks and make room for your next project.

SD DVD data written to DLT drives with DVD Studio Pro can use Data Description Protocol (DDP) version 2.0 or version 2.1. You can also write using CMF version 1.0.

Important: You cannot write HD DVD projects to a DLT drive.

External Video and Audio Monitoring

You can configure your system to support external video and audio monitors. This makes it possible to more closely simulate a viewer's environment before you build the project and burn a test DVD.

When using external monitors, keep the following in mind:

- External video monitors are only used during simulation.
- External audio monitors are active during simulation and while playing from the Assets tab or any of the editors (Track, Story, Slideshow, and Menu Editors).
- When you are using an external video monitor, the Simulator window on your computer is inactive.
- You cannot use the pointer to click buttons on the external video monitor. You must control the simulation by using the Simulator window's controls.
- Depending on your system and the video being simulated, frames may be skipped during playback to maintain synchronized playback with the audio.

The Simulator pane in DVD Studio Pro Preferences contains settings that control whether the external video and audio monitors are used. Additionally, the Simulator contains settings that allow you to change the display mode (4:3 Pan-Scan, 4:3 Letterbox, or 16:9) and resolution (SD, HD 720, or HD 1080). See Simulator Preferences and Simulating with an External Video and Audio Monitor for more information.

Connecting an External Video Monitor

When simulating your project on your computer's video monitor, you do not see video exactly as a viewer would when playing the video using a set-top DVD player connected to an NTSC or PAL monitor. There are two primary differences:

- *Pixel aspect ratio:* Computer monitors always use square pixels, while SD video uses rectangular pixels. When viewed on the computer's monitor, the Simulator scales the pixels to make them fit the 4:3 or 16:9 aspect ratio, which can affect the video appearance.
- *Color space:* Computer monitors generally use RGB color space for their displays while most monitors used to view DVDs use the YUV color space.

The advantage of connecting an external video monitor is that, depending on the monitor you connect and whether your project's assets are already encoded for use on a DVD, you are able to see the video as the viewer would see it.

The external video monitor uses the second monitor as configured in the Displays pane of System Preferences. You must set the resolution and refresh rate to match the external monitor. There are two common approaches to connecting an external video monitor:

- Connecting a video monitor to your computer's S-Video output (if present)
- Connecting a second monitor to your system (if supported)

For example, you could connect an NTSC or PAL monitor to the S-Video output of a PowerBook G4 system.

Note: When connected to an NTSC or PAL monitor, this video output provides only an approximation of what the video will look like when burned to a disc and played on a DVD player. Due to rendering, rescaling, and interlacing issues, you should not rely on this output as a true representation of the video quality, especially with SD projects.

Connecting an External Audio Monitor

There are two primary issues with monitoring your project's audio using the computer's built-in audio system:

- The built-in system cannot play surround sound audio. The audio is first downmixed to stereo, then played.
- The built-in system cannot play DTS audio.

There are two common approaches to connecting an external audio monitor:

- Connecting a suitable AC-3 or DTS decoder to the computer's optical digital audio output (also known as an S/PDIF output)
- Connecting a suitable AC-3 or DTS decoder to the computer's FireWire or USB port

Audio and Video Assets

Audio and video assets can come from a wide variety of analog and digital sources. You must have an equally wide variety of ways to capture these sources on your authoring system. When bringing your assets into DVD Studio Pro, you should keep in mind the following issues.

Have the Assets Been Edited Yet?

DVD Studio Pro is not an editor. You can use it to link assets together on a timeline, as with an editor, and even trim an asset's start and end, but you cannot add effects, such as dissolves and text credits, or perform any audio mixing. Your assets need to be already edited using an application such as Final Cut Pro. If you are editing the assets on your authoring computer, you need to capture them in a format required by your editing software. Once edited, the assets can be imported into DVD Studio Pro (if they are in a QuickTime-supported format) or encoded into DVD-compliant MPEG and audio formats, using either Compressor or third-party applications.

Capturing from an Audio or Video Player

Often your assets will be edited at a post-production facility and you will capture them directly from a video- or audiotape player. In this case, you must have a third-party capture card that supports the video and audio formats used. This video must be captured using Final Cut Pro (or a similar application) in a QuickTime format that the DVD Studio Pro integrated MPEG encoder can convert to DVD-compliant formats, or captured directly as DVD-compliant MPEG and audio sources.

Planning Your Project

2

Before you start authoring your DVD title, it is highly recommended that you set aside time to plan your project. Spending time in the beginning to outline the various aspects of the project will lead to a smoother production with minimal surprises.

This chapter covers the following:

- Investigating Existing DVDs (p. 33)
- Determining Your Target Audience and Playback Device (p. 34)
- Deciding Which DVD Standard to Use (p. 34)
- Deciding Which Video Standard to Use (p. 35)
- Deciding What Content to Include (p. 35)
- Creating a Storyboard (p. 35)
- Designing the Menus and Buttons (p. 37)
- Making Sure Your Content Will Fit (p. 37)
- General DVD Limitations (p. 42)

Investigating Existing DVDs

A very effective way to start planning your project is to spend some time viewing existing DVDs. This process provides you with examples of ways others approached various aspects of their DVD projects, such as using slideshows or providing language selections. It can also help you understand how frustrating the viewing experience can be when a disc has poorly conceived menus or confusing interactivity.

Not all DVD titles are Hollywood releases—be sure to look at a variety of titles, especially those that best match the goals of your project.

Keep in mind that, while DVD Studio Pro provides the tools needed to create highly complex DVDs, most Hollywood-style titles have teams of specialists who work on each project. Before you set out to create a complicated DVD, make sure you understand all aspects of what is involved, and are prepared to deal with them.

Determining Your Target Audience and Playback Device

As with any media project, you must have a clear idea of who the viewers are and what their expectations will be. You may need to create a title that simply plays a movie as soon as the DVD is loaded, with no viewer interaction at all. Or, you may need to create a title with highly customizable languages or display types.

Another major consideration is whether your DVD will be played on a computer. When a DVD is played on a set-top DVD player, the arrow buttons on the remote control provide the primary navigation controls. However, when a DVD is played on a computer, viewers typically use the pointer for navigation. This distinction affects menu designs because you need to make it obvious where viewers should click to activate the buttons.

Additionally, if you need the title to play on older computers, you may need to set the bit rate as low as possible, to increase the chances that the title will play without stuttering.

Deciding Which DVD Standard to Use

DVD Studio Pro gives you the choice of authoring a traditional DVD using standard definition (SD) assets or a DVD using high definition (HD) assets. There are several factors to take into account when deciding which DVD format to use:

- While an HD-based DVD can provide an excellent HD video output, it can only be played on devices designed specifically to support it, such as the Apple DVD Player. SD-based DVDs can be played on all DVD players, including those that play HD-based DVDs.
- An HD project can be written on either a red laser disc (as is used by SD projects) or on a blue laser disc. While SD-based DVD players can read red laser discs, they cannot play HD content from them.

  Important: Only HD projects on special 3x DVD-ROM red laser media are officially supported in the HD DVD specification. You can burn HD projects to traditional red laser media on your system; however, the discs might not play in all HD DVD players.
- Blue laser discs can hold about three times the data that a red laser disc can hold (a single-layer red laser disc can hold 4.7 GB—a single-layer blue laser disc can hold 15 GB). Because you can use SD video in your HD project, writing on a blue laser disc allows you to get much more content on the disc.
- You may need to author both SD-based and HD-based DVD versions of your project. The easiest way to do this is to first author the SD-based DVD version of the project. You can then set the DVD standard to HD DVD—DVD Studio Pro automatically converts the project—and you can then choose which QuickTime assets to encode to the HD format. Alternatively, you can swap SD assets with HD assets as needed.

Deciding Which Video Standard to Use

In addition to choosing the DVD standard you want to use, you must also choose the video standard to use. You can choose between NTSC and PAL. This choice affects the video resolutions and frame rates that are supported.

Important: You cannot use both NTSC and PAL assets in the same project.

Also, be careful not to confuse the video standard setting with the region code setting. The region code setting allows you to specify the regions that can play your DVD—choosing a region that primarily contains PAL countries does not force you to use the PAL video standard, though in most cases you would want to.

See Video Standards of the World for information on which countries support each video standard. It is also useful to keep in mind that DVD players that can play both NTSC and PAL are becoming more common and are most common in PAL countries. However, in most cases, while the DVD player can output either video standard, it assumes the video monitor it is connected to can display either standard (which is less likely to be true).

Deciding What Content to Include

The audio, video, and still-image files used by DVD Studio Pro in authoring DVD projects are known as *assets*. Often you'll have a good idea of what primary assets you want to include when you start your project, but you may think of additional items once it is too late to create them. For example, providing a second language may greatly increase the value of a corporate title but may require you to create new menus to support it.

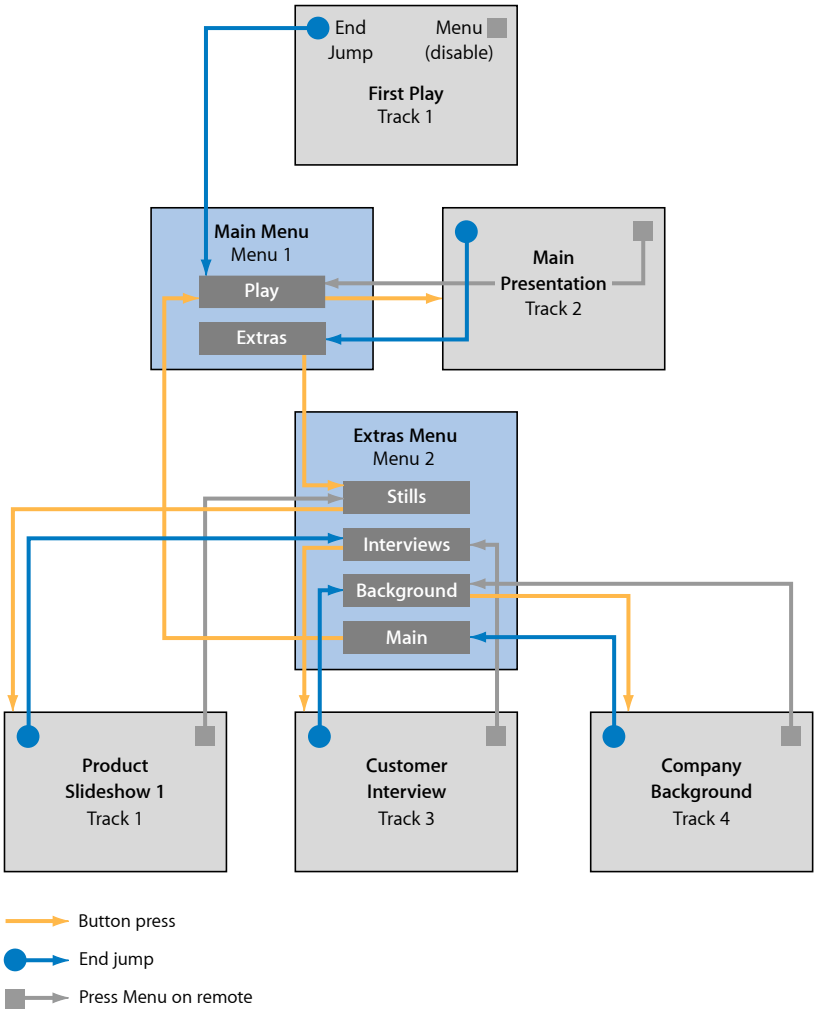
Additionally, including nontraditional items on a DVD, such as PDF files and web links, can add a great deal of value to titles that will be viewed on computers.

You may also have the opposite problem—you may have too much content for a DVD title. Be sure you know which content is required and which is optional. Explore the feasibility of creating a dual-layer DVD or double-sided DVD. Some content may be suitable for encoding at lower bit rates or as MPEG-1 streams. Perhaps instead of using uncompressed AIFF audio, you can use Dolby Digital AC-3 to save space. See Making Sure Your Content Will Fit for more information.

Creating a Storyboard

Even simple DVD titles with only a few menus can benefit from the time you spend in the planning stages.*Storyboarding* includes planning the interaction between the menus, tracks, slideshows, and stories. It helps you visualize what the viewing experience will be and ensures that there are minimal surprises during the authoring process.

You'll find that storyboarding can give you the overarching view of your project needed to plan fairly complex interactivity.



Storyboarding helps you to sort out a variety of navigational issues:

- *What should play first:* By default the first play is set to the first menu, but for many projects you may want something else to be the first thing viewers see when they start playing the DVD.
- *What should be each element's end jump setting:* You may know that you want the DVD to go back to the main menu once a track plays, but have you thought about which button on that menu to highlight?

- *What should the remote control's Menu button do:* It's worth planning what should happen with all of the remote control buttons, but especially the Menu button because its action can vary from element to element.

These and many other decisions need to be made. Drawing them out as a storyboard before starting the project can help eliminate errors or delays while waiting for a decision to be made.

Designing the Menus and Buttons

DVD Studio Pro provides tools that make it easy to create menus without relying heavily on outside graphics applications. For simple titles whose main focus is to provide information, you may be able to rely on the basic button-and-text capability of DVD Studio Pro to create your menus.

For custom titles, you'll need to create your own graphics. Creating graphics for use with video is a bit different from creating graphics for print. Be sure to see Creating Graphics to Use in Menus for information on creating graphics for your title.

In either case, because menus and the buttons on them are the viewers' primary way of interacting with your title, it is important to spend time making sure that they are straightforward, with logical button navigation and clear highlights that let viewers know where they are in the menu.

Making Sure Your Content Will Fit

Be sure to allow time in the planning process to determine whether all of your assets will fit on the type of DVD you are using. You don't want to be surprised when you are finished authoring the title—that is a bad time to find out that the assets won't fit.

What Do You Mean a 4.7 GB DVD Won't Hold 4.7 Gigabytes?

With computers, memory and disk size are commonly expressed in terms such as *kilobyte*, *megabyte*, and *gigabyte*. Technically, a kilobyte should represent 1000 bytes, but due to the binary numbering system computers use, a kilobyte actually represents 1024 bytes. Similarly, a megabyte represents 1,048,576 bytes (and not 1,000,000 bytes) and a gigabyte represents 1,073,741,824 bytes (and not 1,000,000,000 bytes).

Unfortunately, with DVD discs the terms *megabyte* and *gigabyte* do not use the same binary-based standard; they literally refer to the technically accurate 1,000,000 bytes for a megabyte and 1,000,000,000 bytes for a gigabyte. This means that a 4.7 GB DVD disc will actually hold only 4.37 binary-based gigabytes. While the difference is not large (relatively speaking), it must be accounted for if you intend to come close to filling the disc.

Important: When displaying estimated sizes, DVD Studio Pro uses the "1000 bytes equals a kilobyte" system. This means that the estimated sizes refer to the amount of space they will require on the DVD and will be a bit larger than the file sizes shown in the Finder. While the Finder shows binary-based file sizes, you can use its File > Get Info command to see both the binary-based file size and, in parentheses, the "1000 bytes equals a kilobyte" size.

Disc Options

You have a variety of DVD discs to choose from. The one you choose depends on your content, your budget, and whether you intend to use a DVD replication facility. DVD sizes are typically referred to with names such as DVD-5 and DVD-9. While the number in the name is intended to provide general guidance as to the capacity of the disc, it should not be relied on too strictly. (Note that a DVD-4 disc has a higher capacity than a DVD-5 disc.) The following tables list the common sizes used.

Red Laser Discs

The following table lists the names for discs based on red lasers.

DVD name	Disc size	Type	Capacity
DVD-1	8 cm	Single-sided, single-layer	1.46 GB (1.36 binary gigabytes)
DVD-2	8 cm	Single-sided, dual-layer	2.66 GB (2.47 binary gigabytes)
DVD-3	8 cm	Dual-sided, both sides single-layer	2.92 GB (2.72 binary gigabytes)
DVD-4	8 cm	Dual-sided, both sides dual-layer	5.32 GB (4.95 binary gigabytes)
DVD-5	12 cm	Single-sided, single-layer	4.7 GB (4.38 binary gigabytes)
DVD-9	12 cm	Single-sided, dual-layer	8.54 GB (7.95 binary gigabytes)
DVD-10	12 cm	Dual-sided, both sides single-layer	9.4 GB (8.75 binary gigabytes)
DVD-14	12 cm	Dual-sided, one side dual-layer	13.24 GB (12.32 binary gigabytes)
DVD-18	12 cm	Dual-sided, both sides dual-layer	17.08 GB (15.9 binary gigabytes)

If you intend to burn your own discs using your system's DVD burner, you can only use DVD-5 and DVD-9 discs. To use any of the other sizes, you must use a DVD replication facility.

Blue Laser Discs

The following table lists the names for discs based on blue lasers.

DVD name	Disc size	Type	Capacity
HD DVD-4	8 cm	Single-sided, single-layer	4.5 GB (4.19 binary gigabytes)
HD DVD-9	8 cm	Single-sided, dual-layer	9.0 GB (8.38 binary gigabytes)
HD DVD-15	12 cm	Single-sided, single-layer	15.0 GB (13.97 binary gigabytes)
HD DVD-30	12 cm	Single-sided, dual-layer	30.0 GB (27.94 binary gigabytes)

Estimating Whether Your Content Will Fit

While you will often hear that a DVD-5 (or a 4.7 GB disc) can hold two hours of video content, this is really only a rough guideline. The actual amount of video a DVD-5 disc can hold depends on the bit rate the video is encoded at. Often overlooked is the size of audio files—if you plan to use uncompressed AIFF (PCM) audio, you must also take the additional space requirements into account when calculating whether all your content will fit.

If your project needs to fit on a DVD-5 disc that you can burn on your SuperDrive, you need to choose an appropriate bit rate. There is a simple formula you can use. See Fitting Your Project on a DVD-5 Disc for more information.

If you are flexible as to the DVD disc type you can use, you can experiment with different bit rates and determine the disc space required by each. This process is more detailed and includes more variables, such as taking into account additional audio streams and DVD-ROM content. See Calculating Disc Space Requirements for details on precisely determining your disc space requirements.

Fitting Your Project on a DVD-5 Disc

You can use this simple formula to estimate the bit rate you should use to fit your video on a DVD-5 disc:

560/x = bit rate

The "x" represents the length of the video (in minutes) and the resulting bit rate is in megabits per second (Mbps). This formula assumes you are using compressed audio, such as AC-3. If you are using uncompressed audio, you need to subtract 1.5 Mbps (assuming you are using 16-bit stereo at a 48 kHz sample rate) from the bit rate value.

For example, if you have 120 minutes of video, you get a suggested bit rate of 4.67 Mbps (560/120 = 4.67). If you are using uncompressed audio (such as the AIFF format the embedded AIFF encoder supplies), you need to reduce the bit rate to 3.17 Mbps to ensure the video and audio will fit on the disc.

Beware of Setting Your Bit Rate Too High

You will find that with some DVD projects, the content easily fits on the disc, and you may be tempted to use the highest video bit rate available. While higher bit rates produce better quality, you must take into account other factors before deciding to use the maximum allowable value.

The maximum video bit rate allowed on SD-based DVDs is 9.8 Mbps, but rarely is that practical to use because DVD players support combined video, audio, and subtitle bit rates of up to 10.08 Mbps. For HD-based DVDs, the maximum video bit rate is 29.4 Mbps for HD assets and 15.0 Mbps for any SD assets used in an HD project, with an overall maximum bit rate of 30.24 Mbps.

In practice, you should be conservative when determining how high of a bit rate to allow for. Trying to squeeze out the highest possible bit rate for your project can lead to player compatibility and disc space issues.*A general recommendation is to not exceed 9.2 Mbps for the combined video and audio bit rates when authoring SD projects or 29 Mbps when authoring HD projects*.

Important: If you are building your project and DVD Studio Pro detects that the bit rate of the multiplexed stream is too high, the build stops and an error message appears.

Using PCM or AC-3 Audio

A single PCM audio stream using typical settings (as produced with the embedded AIFF encoder) requires 1.536 Mbps, which leaves an absolute maximum bit rate for the video in an SD project of around 8.54 Mbps. If there are two PCM audio streams, 3.07 Mbps must be allowed for the audio, leaving just 7.01 Mbps for the video.

Note: Even though you can only play one audio stream at a time, the bit rates of all audio streams must be added together when determining the overall bit rate for a track. Similarly, all subtitle streams must be added together and added to the overall bit rate.

Using AC-3 audio in place of the PCM audio leaves far more room for the video bit rate. Stereo AC-3 audio using typical settings requires only about 224 kbps—using two stereo AC-3 streams in place of the PCM audio leaves about 9.6 Mbps for the video.

See Calculating a Project's Disc Space Requirements for more information about allowances for other audio formats.

Subtitle Allowances

Subtitles generally use a very small bit rate—about 10 kbps per stream. Larger subtitles that change frequently or use graphics can have a significant impact though and can affect the maximum bit rate you can use for the video.

Multiple Video Angles

Using multiple video angles in a track also affects the maximum allowable video bit rate you can use. Due to the way the DVD specification requires video streams to be multiplexed together, the number of video streams determines the maximum video bit rate you can use in SD projects. The maximum combined bit rates (highest bit rate video stream + all audio streams + all subtitle streams) you can use for each multi- and mixed-angle track in an SD project is from 8.0 Mbps with two streams to 7.0 Mbps with nine streams. See Encoding Video for Multi-Angle Tracks for more information.

HD projects using multiple video angles in a track are limited to 24.0 Mbps for the maximum combined bit rates, regardless of the number of video angles.

Transitions

When you add a transition to a menu, to a still clip in a track, or to slides in a slideshow, you need to account for the additional video it creates.

- In the case of menus, the transitions become short rendered video clips stored in the same video object (VOB) file as the menus. This means that, in addition to the overall amount of disc space menu transitions require, you must also consider their impact on the 1 GB menu VOB file size limit. See Standard SD DVD Video Zone Files for more information. You must also take into account that a transition video clip is rendered for each menu button that has transitions enabled—a menu with 18 buttons can require 18 transition video clips.
- In the case of still clips in a track and slides in a slideshow, adding transitions increases the amount of disc space each requires even if the transition does not increase the length of the track or slideshow. This is because stills and slides use much less disc space than the motion video created by the transitions, even if the transition is from one slide to another.

The amount of disc space required by each transition varies depending on their length and type. In general, for SD projects, which use a bit rate of 6 Mbps for transitions, you should allow 750 KB of disc space for every second of transition time in the project. For HD projects, which use a bit rate of 20 Mbps for transitions, you should allow 2.5 MB of disc space per second.

Using the Video Bit Rate

The video bit rates you calculate can be used as the bit rate entry of your encoder, regardless of the encoding method you intend to use (one pass, one-pass variable bit rate [VBR], or two-pass VBR).

When using one of the VBR encoding methods in the integrated MPEG encoder, the “Bit rate” setting affects the amount of disc space that the MPEG video file requires, while the “Max bit rate” setting sets the highest video bit rate that is allowed in the file (but does not affect the file size). See MPEG Encoding Methods for more information.

General DVD Limitations

Following are some general limitations you may run into while authoring your DVD project with DVD Studio Pro. Most of these limitations are due to DVD-Video specification requirements.

Note: With the exception of the number of buttons on a menu, the same limits apply to both SD and HD projects.

Project

Following are the limitations within a DVD Studio Pro project.

- *Maximum number of tracks, stories, and slideshows in a project:* 99
- *Minimum number of menus in a project:* 0
- *Minimum number of tracks or slideshows in a project:* 1

Menus

Following are the menu-related limitations.

- *Maximum number of menus in a project:* 10,000
- *Menu aspect ratio support:* 4:3 and 16:9 menus can be used in the same project.
- *Maximum number of buttons on an SD-based DVD 4:3 menu:* 36
- *Maximum number of buttons on an SD-based DVD 16:9 menu:* 18, unless Pan Scan & Letterbox is selected, which then sets the maximum to 12
- *Maximum number of buttons on an HD-based DVD 4:3 menu:* 48
- *Maximum number of buttons on an HD-based DVD 16:9 menu:* 24, unless Pan Scan & Letterbox is selected, which then sets the maximum to 16

Tracks

Following are the track-related limitations.

- *Maximum number of video streams in a track:* 9
- *Minimum number of video streams in a track:* 1
- *Maximum number of audio streams in a track:* 8
- *Maximum number of subtitle streams in a track:* 32
- *Maximum number of cell markers in a track:* 255
- *Maximum number of chapter markers in a track:* 99 (Each chapter marker is also a cell marker.)
- *Maximum combined number of chapter markers and individual chapter end jump settings in a track:* 106 (See Setting Chapter Marker End Jumps for more information.)
- *Maximum number of buttons on an SD-based DVD 4:3 track's button highlight marker:* 36

- *Maximum number of buttons on an SD-based DVD 16:9 track's button highlight marker:* 18, unless Pan Scan & Letterbox is selected, which then sets the maximum to 12
- *Maximum number of buttons on an HD-based DVD 4:3 track's button highlight marker:* 48
- *Maximum number of buttons on an HD-based DVD 16:9 track's button highlight marker:* 24, unless Pan Scan & Letterbox is selected, which then sets the maximum to 16

Stories

Following is the story-related limitation.

- *Maximum number of segments:* 98 (must all be from the same track)

Slideshows

Following are the slideshow-related limitations.

- *Maximum number of slides in a slideshow:* 99
- *Minimum number of slides in a slideshow:* 1

Scripts

Following are the script-related limitations.

- *Maximum number of scripts in a project:* 10,000
- *Maximum number of command lines in a script:* 124
- *Minimum number of command lines in a script:* 1

How Do You Do That?

3

While investigating other DVDs, you may decide to include similar specialized features in yours.

This chapter covers the following:

- Creating a Simple DVD (p. 45)
- Creating a Play One or Play All Project (p. 47)
- Grabbing a Still Image from Your Movie (p. 50)
- Adding Easter Eggs to Your Menus (p. 51)

Creating a Simple DVD

While DVD Studio Pro is capable of creating complex projects, you may find yourself needing to create a very simple project that does nothing more than start playing when you insert the DVD into a DVD player—with no menus and no viewer interaction at all. This could be a disc that plays in a standalone kiosk or a DVD daily whose only purpose is to distribute a video track for approval.

To create a simple DVD

1. Choose File > New (or press Command-N) to create a new project.

   By default a new project contains Menu 1 and Track 1.

2. Select the Menu 1 tile in the Graphics tab and press Delete.
3. Control-click the Track 1 tile, then choose First Play from the shortcut menu.

   This sets the project to automatically start playing this track once the DVD is inserted into a DVD player. (By default, DVD Studio Pro sets Menu 1 as the First Play element.)

4. Drag the movie from the Library or a Finder window to the Track 1 tile in the Graphics tab.

   This not only imports the movie but assigns it to Track 1.

5. Select the Track 1 tile in the Graphics tab so that the Track Inspector appears.

6 Do one of the following to control what happens when the movie finishes playing:

- To have nothing happen when the movie finishes playing, leave End Jump (in the top section of the Track Inspector) set to Not Set. Once the movie finishes playing, the DVD player will stop. The viewer can press Play to play it again.
- To have the track play again in an infinite loop, choose the track from the End Jump pop-up menu.

And that's it. You might want to consider adding a few additional elements to the project that would improve the viewer's experience.

Adding Chapter Markers

Depending on the length of the movie, it can be very helpful for the viewer to be able to use the DVD player's Previous and Next buttons to quickly skip through the movie to points you define with chapter markers.

If the movie was edited in Final Cut Pro, you can add the chapter markers at each scene change or at other significant points in the movie. These chapter markers will automatically import into DVD Studio Pro. See Adding and Configuring Markers in Final Cut Pro and Final Cut Express for more information.

You can also manually add the markers in the DVD Studio Pro Track Editor. Even just placing markers every five or ten minutes can help the viewer locate specific parts of the movie. See Working with Markers for more information.

Adding a Menu

This goes a bit against the general idea of a simple DVD project, but it might be worth adding a simple menu so that the viewing experience once the movie finishes playing is a bit better. For example, you could leave the track set as the First Play element but have the track jump to a menu once it finishes playing. The menu could have a single button that says "Play Again?" Or the menu could have a credit list.

If You're Using Multiple Movies

You may have a situation where you have more than one movie to put on the DVD. You can handle that in a couple of ways:

- *You can put each movie in its own track:* If you do not want to have a menu, you can have the End Jump of the first track set to the next track, linking the tracks together. This assures that the viewer will watch the movies in the order you specify.
- *You can concatentate the movies in a single track:* This is a bit easier than placing each movie in its own track because you do not have to set the End Jumps for each, and it also ensures that the movies will be watched in a specific order. This does require that each movie uses the same video and audio formats.

In most cases with multiple movies, you will want to create a menu where the viewer can choose which movie to watch. You may even want to have a menu where the viewer can choose to play a specific movie or to play all of them. See Creating a Play One or Play All Project for information on setting up this situation.

Creating a Play One or Play All Project

You may have a project with a track that contains several sections that a viewer either might want to watch individually or all at once, one after the other, from the start to the end.

It's actually fairly easy to set this up using stories. Once it is set up, you can optionally add additional functionality to polish the project.

Stories in a Nutshell

Stories allow you to configure alternative ways to play the movie in a track. Stories use chapter markers to divide the movie into sections (cells) that you can then configure to play, skip, or even play more than once. You can also choose to play these sections in a different order than they appear in the track.

Stories are elements you can add to your project that are tied to a specific track—a story can only contain content from a single track. However, a track can have multiple stories.

An advantage of stories is that because they only redefine how to play an existing track's movie, they do not require any additional disc space on the DVD. They do count against the 99 track and slideshow limit that DVD Studio Pro projects have.

See Introduction to Stories for more information about stories.

Creating the Basic Project

You follow three primary steps to create this project:

Stage 1: Creating the Track and Adding Chapter Markers to It

The chapter markers define the sections that you can use for your stories. You can manually add the markers in DVD Studio Pro, import the chapter markers you added in Final Cut Pro or Final Cut Express, or import chapter markers from a text file.

Stage 2: Creating and Configuring the Stories

For this project, you create a story for each individually playable section of the movie. Each story contains one chapter marker to define the section of the movie to play. Each story also has an End Jump setting that takes the viewer back to the menu.

Stage 3: Creating and Configuring the Menus

Once you have the stories defined, you can create the one or more menus needed to access them.

Creating the Track and Adding Chapter Markers to It

How you create the track depends on your movies:

- *If you have a single movie that contains all of the sections edited together:* This is the ideal situation because, assuming you edited them together in Final Cut Pro, you could also have added the chapter markers needed to set up the stories. You can manually add the chapter markers in DVD Studio Pro; however, most often you will not be able to place them on the exact frame you would like to use because the markers must be on an I-frame or a key frame.
- *If you have multiple movies, with each containing one or more sections:* In this situation, you place all of the movies in the same track (in the order they should play for the "play all" button). This situation also requires you to manually add the chapter markers.

  Note: Having multiple movies makes it tempting to skip using stories and just create a separate track for each section. You could then create buttons to play each of the tracks. The difficulty in this is creating the "play all" button, because each track's End Jump would need to be set to go back to the menu. Even if you managed to use scripts to get each track to jump to the next track, you would almost always have a short pause during the jump while the DVD player located the next track. Using stories makes it possible to have seamless playback between the sections for the "play all" button while retaining the ability to play each section individually—all without using scripts.

To create and configure the track

1. Click the Add Track tool in the DVD Studio Pro toolbar to add a new track.

   You can also use the track that is automatically added to new projects.
2. Import the movie or movies into the project.
3. Do one of the following:
   - If you have a single movie, drag it to the track in the Track Editor.
   - If you have multiple movies, drag each to the Track Editor, in the order that you want them to play.
4. Add the chapter markers to the track by positioning the Track Editor's playhead on the first frame of each section and pressing M.

   The markers are placed on the nearest I-frame or key frame. You can move the marker forward or backward to try to locate a better frame if needed.

   Note: If you used a single movie that had the chapter markers added in Final Cut Pro, the chapter markers should already be present and you can skip this step.

   You can also name the chapter markers to help identify them later when creating your stories. See Importing Assets and Working with Markers for additional information.

Creating and Configuring the Stories

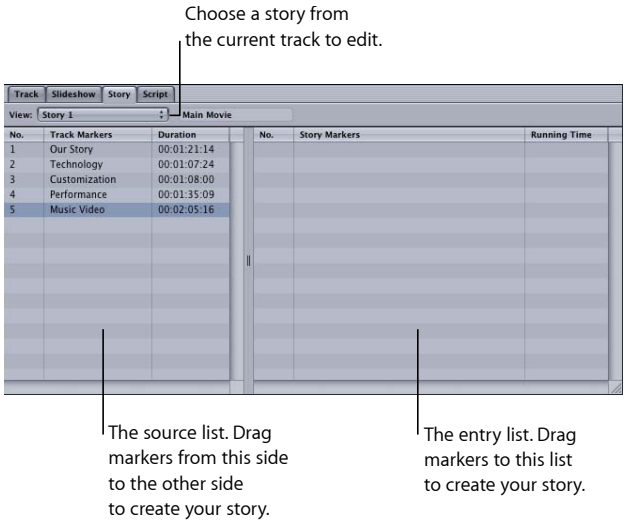
Once you have the track configured with chapter markers to identify each section, you are ready to create the stories. For this project, you need a story for each section of the movie that you want the viewer to be able to play individually. Once you create the story, you need to choose the chapter marker that defines the section of the track that that story should play.

To create and configure the stories

1 Click the Add Story tool in the Toolbar.

This adds a new story, related to the currently selected track, to your project.

2 Double-click the new story's icon in the Graphical tab to open it in the Story Editor.



The left side of the Story Editor lists the chapter markers in the track. The right side lists the markers that have been assigned to this story (which is empty at the moment).

3 Locate the chapter marker on the left side that you want this story to play and drag it to the right side.

Note: If there are additional chapter markers in the section of the movie you want this story to play, you need to drag them to the right side as well, in the order that they are placed in the track.

4 Repeat the above steps for each section of the movie.

As mentioned previously, naming the chapter markers makes this process much easier. Naming the stories, especially if there are a lot of them, can also help the process.

Creating and Configuring the Menus

Once you have created your stories, you are ready to create the menu (or menus, depending on how many stories you created and how many buttons you want to have on each menu).

The basic concept for the menu is to have a Play All button that plays the entire track and separate buttons that play each of the stories. You can use any of the normal menu creation methods. See Introduction to Creating Menus for information on the types of menus you can create.

Grabbing a Still Image from Your Movie

DVD Studio Pro includes a feature that allows you to export a still image from a movie in a track. The still image is saved as a TIFF file that you can use as a menu background or open in a graphics program. The file matches the movie's resolution. Anamorphic 16:9 video results in an anamorphic still image using a 4:3 aspect ratio (which works fine as a 16:9 menu background). This feature works with SD as well as HD projects.

The one issue is that the still image must be from an I-frame (MPEG-1 or MPEG-2 video) or a key frame (H.264 video). This means you may not be able to get a still from the exact frame you would like.

To create a still image from a movie

1. In the Track Editor, move the playhead to the frame you would like to have a still image made from.
2. Press M.

   This adds a marker to the timeline. The exact position of the marker depends on how close you are to an I-frame or key frame as well as the Snap To setting in the Track pane of the DVD Studio Pro Preferences window. You can drag the marker left and right to see if either of those positions would produce a better still image. (This is easier to do if you zoom into the timeline.)
3. Click Save Still in the Marker Inspector.

   A dialog appears for saving the file.
4. Enter a name for the file (the default name is the marker's name) and choose the location to save it to (the default location is in the same folder as the video file).
5. Click Save.

   You can import the still image file into this project or open it in a graphics application to add effects or text.

Adding Easter Eggs to Your Menus

It is becoming increasingly popular to add hidden items to DVD projects. For example, you may include a track or menu that you only want people to find if they know the right buttons to push.

Most often, invisible buttons on less-used menus are used to access these items. Depending on how elaborate you want to be, you can configure the button navigation so that the viewer can only get to the invisible button by pressing non-obvious arrow buttons on the remote control.

For example, if you have a menu with a column of six buttons, you could set the button navigation so that the invisible button is reached only by pressing the left arrow button when on the fourth button in the column. (Most viewers would not think to press the left arrow button if the menu's buttons are arranged in an obvious up/down fashion.) You can make it even harder to find by using multiple invisible buttons, with each requiring the correct arrow button presses to get to the next, with incorrect presses jumping back to the visible buttons.

About Invisible Buttons

You can set an overlay button to be invisible by selecting Invisible in the Advanced tab of the Button Inspector. In this case, making a button invisible means that the highlight colors do not appear when the button is selected and activated. This can be confusing when combined with visible buttons on a menu because it can lead to a condition where nothing appears to be selected.

Instead of using a true invisible button, you may want to use a button whose normal state is invisible, but which acts as a visible button when selected and activated. To do this, you only have to make sure the button has no normal state graphics on the menu's background (making the button invisible when not selected), but does have supporting graphics, such as a star or happy face, in the overlay file that will show the selected and activated highlight colors. Note that if you do this, a viewer playing the DVD on a computer may be able to find the button just by waving the pointer over the menu.

See Advanced Tab in the Button Inspector for information on invisible buttons.

Important: While using invisible buttons can make it difficult for viewers to accidentally find hidden features, you should not assume this is entirely secure. Determined viewers can use a variety of methods to find hidden content on a DVD disc.

Preparing Video Assets

4

Before you can begin building a DVD project, you must have correctly prepared video source material.

This chapter covers the following:

- Introduction to Preparing Video Sources (p. 53)
- NTSC or PAL? (p. 54)
- Using 24 fps Video (p. 55)
- Choosing an Aspect Ratio (p. 56)
- About MPEG Video (p. 60)
- Encoding Video Materials for DVD (p. 61)
- Using the Integrated MPEG Encoder (p. 68)
- Encoding Video for Multi-Angle Tracks (p. 74)
- Adding Markers to Your Video (p. 76)
- About H.264 Video (p. 80)
- About HDV Video (p. 81)
- DVD Video Source Settings Summary (p. 82)

Introduction to Preparing Video Sources

After you have captured and edited your source material, you need to encode it to make it DVD-compliant. Compressor is a full-featured video and audio compression application included with Final Cut Studio that you can use to create DVD-compliant assets for use in DVD Studio Pro. DVD Studio Pro is integrated with Compressor to provide easy access to the commonly used MPEG, AIFF, and Dolby Digital AC-3 encoding functions for converting QuickTime video to DVD-compliant assets.

The DVD Studio Pro integration with Compressor allows you to directly import QuickTime sources into a project—the encoders work with the sources while you continue authoring the project.

You can also use Compressor as a standalone application to get more options and control over the encoding process. Compressor also integrates well with Final Cut Pro, providing exceptionally high-quality MPEG-2 streams directly from Final Cut Pro sequences.

This chapter describes how to prepare video source material for use in DVD Studio Pro and how to use the integrated MPEG encoder. For more information on DVD-compliant material, see About MPEG Video.

There are three areas in a DVD project that can use video sources:

- *Tracks:* This is the primary area that uses video sources.
- *Menus:* This area uses video sources when you are creating motion menus. Menus can also assign video sources to buttons and drop zones. For the most part, video sources used for motion menus must follow the same rules as video sources used for tracks. See Preparing Menu Assets for more information.
- *Alpha Transitions:* You can use specialized video sources as alpha transitions in your menus, tracks, and slideshows. See Preparing Alpha Transitions for more information.

The DVD-Video specification has strict requirements for several aspects of the sources used. For best results, you should create and capture your video and audio using the settings required for DVD.

See DVD Video Source Settings Summary for a complete list of settings required for a source to be DVD-compliant.

NTSC or PAL?

A DVD-Video title must contain either all NTSC or all PAL sources. If you intend to create a title that can be played on either NTSC or PAL DVD players, you must create two titles and two versions of the sources (including all graphics and video, which will require significant effort), one for each standard.

About the Terms "NTSC" and "PAL"

The terms "NTSC" and "PAL" are technically incorrect when used with respect to DVDs. These terms specify a variety of things with respect to an SD composite video signal. When you refer to a video asset as NTSC or PAL with respect to SD-based DVDs, you are defining the asset's frame rate and resolution. With most HD assets, the terms NTSC and PAL refer only to the frame rate, because the resolution is far different than an SD video asset.

Many DVD players in PAL countries can also play NTSC DVD-Video titles. It's important to understand that these players often do not convert NTSC video to PAL—they simply output the NTSC sources. You must connect an NTSC or dual-standard video monitor to view the output. Additionally, be aware that all DVD players have a region code that prevents them from playing DVD-Video titles not intended for the player's region.

Using 24 fps Video

Often the video content for a DVD project originates from film shot at 24 frames per second (for NTSC this is actually 23.976 fps, which is more commonly referred to as 23.98 fps). The DVD specification allows you to include 24 fps MPEG-2 assets as long as they are properly flagged so the DVD player can decode them by either using a 3:2 pulldown (for NTSC DVD players) or playing them 4% faster (for PAL DVD players). The video resolution also must match those allowed for the intended video standard. See Choosing a Video Resolution for details on supported video resolutions.

This means that there are NTSC and PAL versions of 24 fps MPEG-2 assets, and you can only use NTSC 24 fps assets in NTSC projects and PAL 24 fps assets in PAL projects.

Encoding video that originates with a 24 fps rate as a 24 fps MPEG asset has two primary advantages:

- Less time is spent on the encoding process.
- Smaller files are produced.

These advantages are due to fewer frames being encoded, especially when compared to NTSC frame rates.

Important: MPEG-2 assets that include 23.98 frames to play at 29.97 fps show as 29.97 fps assets in QuickTime, Compressor, and DVD Studio Pro.

Importing 24 fps Assets

How DVD Studio Pro handles your 24 fps assets depends on whether or not they are already MPEG-2 encoded:

- *If you import 24 fps MPEG-2 assets:* They are handled correctly and remain 24 fps when you build the project.

  Note: 24 fps assets show as their display rate setting when viewed in the Track Editor. This makes them appear as if they were at the NTSC or PAL frame rate. You can confirm they are actually 24 fps by selecting them in the Assets tab and verifying the frame rate in the Asset Inspector.

- *If you import 24 fps QuickTime assets:* They are encoded as either 29.97 fps or 25 fps MPEG-2 files, based on your project's video standard, and are no longer 24 fps when you build the project.

To create a 24 fps MPEG-2 asset, you need to use Compressor (included with DVD Studio Pro) or a third-party encoder that supports encoding 24 fps MPEG-2 assets.

Using 24 fps Video in Tracks

You can use 24 fps video assets in tracks just like you would use regular 29.97 fps or 25 fps video assets, as long as they match the project's video standard (NTSC or PAL). You can also combine 24 fps assets with regular video assets within a track, as long as they use the same resolution.

Using 24 fps Video in Menus

You can use 24 fps assets in menus as backgrounds or assets for buttons and drop zones. You can also combine 24 fps assets with regular video assets within a menu.

If the menu must be rendered because it contains shapes, drop zones, or text objects, it is rendered at the project's frame rate, even if the menu's background is 24 fps.

Choosing an Aspect Ratio

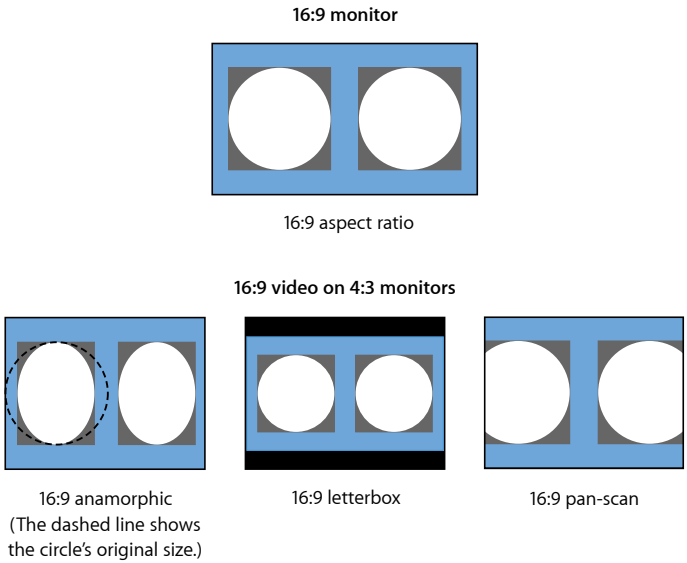
The *aspect ratio* is the ratio of the width of the visible area of the video frame to the height of the visible area. Standard NTSC and PAL monitors have a picture aspect ratio of 4:3 (or 1.33, which is the width divided by the height). Some High Definition Television (HDTV) formats have a picture aspect ratio of 16:9, or 1.78.

The DVD specification supports both 4:3 and 16:9 sources, but it does not support HD video. Most HD video formats use a combination of features to create the high definition image, including a much larger frame size than DVD-Video supports.

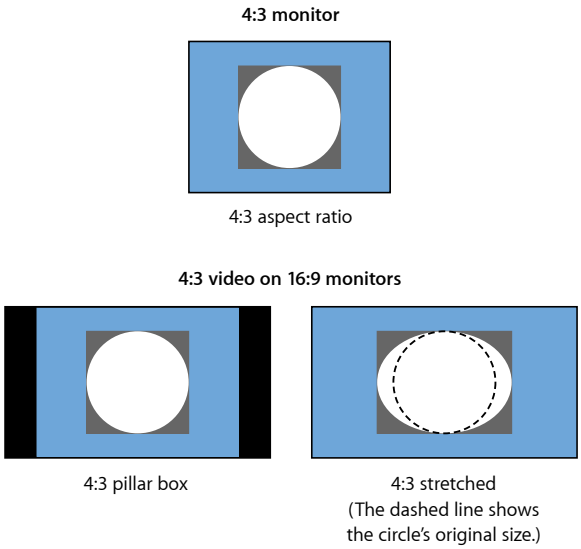
HD-based DVDs also support both 4:3 and 16:9 sources, as well SD and HD video formats.

Using 16:9 sources in your project raises a number of issues that you need to be aware of. Your main goal is to ensure that 16:9 assets play back correctly on 16:9 monitors and as expected on 4:3 monitors (and that 4:3 assets play correctly on both monitor types as well). Incorrect settings can lead to distorted video. For example, the video may appear horizontally compressed (objects look "skinny") or expanded (objects look "fat").

This illustration shows the viewing options for a 16:9 asset.



This illustration shows the viewing options for a 4:3 asset.



Read the following sections to find out more about using 16:9 assets in your projects.

What Exactly Is a 16:9 Asset?

When you decide to use 16:9 assets in a DVD Studio Pro project, it is crucial that you understand exactly what attributes your 16:9 media should have.

16:9 and SD Projects

The DVD specification and DVD Studio Pro require 16:9 video to be *anamorphic*. An anamorphic 16:9 video frame has the same number of pixels as a 4:3 video frame. When displayed on a 16:9 monitor, the frame is horizontally stretched to fit the screen, and the content appears normal. When viewed on a 4:3 monitor, however, the video content appears horizontally compressed (see the illustrations in Choosing an Aspect Ratio).

The most common error is to letterbox your 16:9 video assets before bringing them into DVD Studio Pro. Once a 16:9 asset has been letterboxed, it becomes a 4:3 asset with black bars along the top and bottom of the video image. If you flag letterboxed source video as 16:9 video when encoding it, you will have problems when you play it back later.

16:9 and HD Projects

HD projects can use a wide variety of video resolutions. Several of these are true 16:9 (1280 x 720p and 1920 x 1080i) while several others use the same anamorphic method used in SD projects (720 x 480p, 720 x 576p, and 1440 x 1080i).

Using Pan-Scan to Display 16:9 Video

The *pan-scan* method of displaying 16:9 video on a 4:3 monitor was developed as a compromise between letterbox, which displays all the video content but with black areas at the top and bottom, and the only other alternative: filling the entire 4:3 screen, but cropping some of the content. With pan-scan, you can choose which bits of the 16:9 content to crop, ensuring the action is not lost by displaying the center of the screen only. The pan-scan method can result in sudden jumps from one side of the screen to the other (for example, to follow a conversation's dialogue), which may make your video look as if edits have been made.

To make pan-scan work, you must have a *pan-scan vector*, a frame-based value that controls which part of the content to use. Someone watching the video creates the vector, deciding which parts should be seen. This vector must be available when the video is MPEG-encoded. The MPEG encoder included with DVD Studio Pro does not support pan-scan vector information. However, if the information is already part of an MPEG-encoded video stream, created with an encoder that supports the vector information, DVD Studio Pro passes this information along.

Virtually all movies shown on TV have been through the pan-scan process; however, pan-scan vectors are rarely used for movies released on DVD. Instead, a version of the movie is made using the 4:3 pan-scanned source and is not intended to be played as a 16:9 video on 16:9 monitors. The other side of the disc often contains the true 16:9 version, set to display as letterboxed video on 4:3 monitors.

Important: Do not use pan-scan if your video does not actually support it. If you do, only the center part of the frame will appear.

MPEG Encoding and 16:9 Video

It's important to correctly identify your source video as either 4:3 or 16:9 before encoding it. At this point, you are only identifying it—you are not defining how it should be handled when played back. When using the integrated MPEG encoder, you can select the video's aspect ratio in the Encoding pane of DVD Studio Pro Preferences.

Using 16:9 Assets in Tracks

Each track within a DVD Studio Pro project has an aspect ratio setting. This setting lets the DVD player know how to display the video when playing back the title.

With a 16:9 track, you specify how it will play back on a 4:3 monitor: Pan-Scan, Letterbox, or Pan Scan & Letterbox (allowing the viewer to choose). As mentioned previously, pan-scan is rarely used and should never be selected unless the encoded video contains pan-scan vector information.

Mixing 16:9 and 4:3 Assets in a Track

Keep in mind that a track's aspect ratio setting applies to the entire track. If you mix 16:9 assets with 4:3 assets in a track, you will have problems when playing it back. For example, if you set the aspect ratio to 16:9 Letterbox, the 4:3 video will also be letterboxed and end up looking vertically compressed.

To be safe, do not mix 16:9 and 4:3 assets in the same track. Instead, create separate tracks for each. You can use the Connections tab in DVD Studio Pro to control the playback order of the tracks.

Some Players Cheat!

Unfortunately, not all players handle 16:9 video correctly. The aspect ratio setting for each track is stored in the track's video title set file (vts_01_1.vob, for example). Most DVD players read the setting and process it correctly, but some DVD players ignore this setting and instead look at the aspect ratio setting of the video itself. For the most part, this works out, but it can result in inconsistencies when playing the title on different DVD players, particularly if you are not careful while encoding and authoring.

Buttons over 16:9 Video Tracks

To place a button over a video track, you add a menu overlay to a subtitle stream in the track. These overlays are not processed in the same way as the video, so you must create a separate overlay for each display mode (16:9, 4:3 letterbox, and 4:3 pan-scan). You then need to create a script that selects the correct subtitle stream to display based on the DVD player's settings.

See What Happens with Different Aspect Ratios? for information on using subtitle streams to place buttons over a video track, and see Creating Scripts for information on creating scripts.

Using 16:9 Assets in Menus

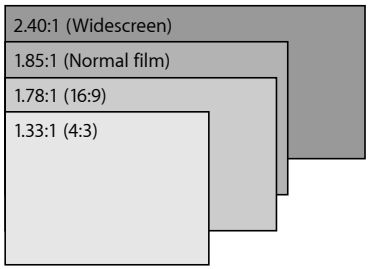
Typically you'll want to use 16:9 menus with 16:9 tracks. Most of the same concerns with video apply to menus as well—specifically how the 16:9 menu is displayed on a 4:3 monitor.

With a 16:9 menu, you specify how it will play back on a 4:3 monitor: Pan-Scan, Letterbox, or Pan Scan & Letterbox (allowing the viewer to choose). As mentioned previously, pan-scan is rarely used, and should never be selected unless the encoded video contains pan-scan vector information.

See Understanding Pixel Differences in Graphics and Video for information on the image size settings you should use when creating 16:9 menus.

Issues with Film Aspect Ratios

While 16:9 is a fairly wide aspect ratio, it is not wide enough to contain an entire frame from a typical Hollywood movie. Two film aspect ratios are widely used now: Normal is 1.85:1 and Widescreen is 2.40:1 (for comparison, 16:9 is 1.78:1). For normal titles (those that use the 1.85:1 aspect ratio), a small amount of letterboxing or pan-scan cropping is required to transfer the title to DVD, but for Panavision titles significant letterboxing or pan-scan cropping is necessary. This processing must be done before the video is MPEG-encoded. The DVD specification supports only 4:3 and 16:9 aspect ratios.



You should not be surprised to see some letterboxing when playing a Panavision movie on a 16:9 monitor.

About MPEG Video

MPEG (Moving Picture Experts Group) is a family of video and audio compression formats that make high-quality titles possible on DVD. There are a broad range of MPEG types and settings; use care to select those that are DVD-compliant with the DVD standard (SD or HD) you are using. DVD Studio Pro imports MPEG assets created with a wide variety of third-party products. The following section, Encoding Video Materials for DVD, provides a general overview of MPEG, as well as details that relate specifically to DVD Studio Pro and its integrated MPEG encoder.

Encoding Video Materials for DVD

The DVD specification requires video movies to be in a DVD-compliant MPEG format. There are a number of methods for converting video from its current format to MPEG.

DVD Studio Pro includes an integrated MPEG encoder, which can quickly encode your QuickTime movies into DVD-compliant MPEG-2 files. See Using the Integrated MPEG Encoder for more information.

For analog sources, you need a hardware video capture card to digitize your video. Depending on the card's output format, you may then need a transcoder to convert it to MPEG.

Elementary and Multiplexed MPEG Files

There are two common types of MPEG file structures: elementary and multiplexed. Elementary files contain only one stream of data, either the video or the audio. Multiplexed MPEG files, also known as *system*, *transport*, or *program* files, have the video and audio combined into a single file.

MPEG files that are imported directly into DVD Studio Pro must be elementary MPEG files. You can use an MPEG utility to convert multiplexed MPEG files into elementary streams. The integrated MPEG encoder converts QuickTime files into elementary MPEG streams.

When creating an HD project, you can import HDV and H.264 streams, both of which are multiplexed QuickTime streams.

Choosing Between MPEG-1 and MPEG-2

The DVD specification allows for the use of either MPEG-1 or MPEG-2 encoded video. In general, MPEG-1 provides for smaller file sizes but reduced picture quality (by scaling a half-screen image to full screen), while MPEG-2 provides for better quality with larger file sizes.

- MPEG-1 is generally used for titles for which file size is critical and that will be played back on a computer (not a set-top DVD player).
- MPEG-2 is usually used for DVD titles on DVD media. The integrated MPEG encoder encodes video into MPEG-2.

DVD Studio Pro works with both MPEG-1 and MPEG-2 video assets in your SD project tracks, as long as they are DVD-compliant. MPEG-1 video used as menu backgrounds is rendered to full D1 MPEG-2 when the project is built.

Important: HD projects cannot use MPEG-1 video.

Choosing a Bit Rate for SD Projects

Bit rate directly determines file size, and thus how many minutes of material you can fit onto a DVD disc. SD-based DVD players support combined bit rates of up to 10.08 megabits per second (Mbps), but this must include the audio and subtitles as well. The maximum video bit rate is 9.8 Mbps.

Note: Some DVD players have trouble playing video that uses sustained high bit rates. On such players, you may see dropped frames during playback.

Typical maximum bit rates used for video are around 8 Mbps. The maximum MPEG-1 bit rate is 1.856 Mbps, while 1.15 Mbps is most typical.

The actual video content determines how low a bit rate you can use and still get acceptable quality. Video with little movement works well at lower bit rates, while higher bit rates are best at handling video with a lot of movement (a quick camera pan, for example).

For more information on choosing a bit rate that ensures all the content in your project will fit on a DVD, see Making Sure Your Content Will Fit.

Choosing a Bit Rate for HD Projects

Choosing a bit rate for use in HD projects is similar to doing so for SD projects, but there are some differences.

The maximum overall bit rate for HD projects is 30.24 Mbps. While an HD project can use both SD and HD video assets, the maximum bit rate you can use is different for each:

- *HD assets:* 29.4 Mbps

  Note: HD assets include the 480p and 576p resolutions.

- *SD assets:* 15.0 Mbps

MPEG Encoding Methods

There are three common methods of encoding video: CBR (constant bit rate, also known as *one-pass*), one-pass VBR (variable bit rate), and two-pass VBR.

- *CBR (one-pass) method:* You choose a bit rate and it is used for the entire video, regardless of its content. The advantage of this method is that you can reliably predict the final encoded file size. By adjusting the bit rate, you can ensure the video will fit on the DVD. The disadvantage is that the same bit rate gets applied to all of the video, regardless of the motion content. You must choose a high enough bit rate to provide acceptable results for the scenes with motion, even if they are only a small part of the movie.

- *One-pass VBR method:* You choose a basic bit rate and a maximum bit rate. The encoder detects the amount of motion present in the video as it encodes and adjusts the bit rate appropriately—scenes with motion use higher bit rates (up to the maximum setting you choose) and scenes with little motion use the lower, basic bit rate. The disadvantage of this method is that the quality will not be as good as with the two-pass VBR method.
- *Two-pass VBR method:* You choose a basic bit rate and a maximum bit rate, just as with the one-pass VBR method. The difference is that the encoder makes two passes through the video to encode it. The first pass examines the video to learn about its motion content. The second pass performs the encode, varying the bit rate to provide better results in scenes with motion (as compared to the one-pass VBR method). The disadvantage of this method is that it takes twice as long as the one-pass VBR method.

Important: With the VBR methods, the basic bit rate setting determines the encoded file size. The maximum bit rate setting does not affect the file size. Additionally, the VBR methods are most effective when the maximum bit rate is about double the basic bit rate, or at least 1 to 3 Mbps higher than the basic bit rate.

The integrated MPEG encoder allows you to select which of these methods you want to use.

Choosing a Video Resolution

The resolution determines the number of pixels processed within a frame. The more pixels used, the sharper the details in the image. Note that regardless of the resolution you choose, most DVD players play back at full screen. The following is a list of common resolutions used with MPEG-1 and MPEG-2 video with DVD Studio Pro.

Note: Menus must use full D1 resolution MPEG-2 video. If you assign any other resolution or an MPEG-1 asset, the video will be transcoded to full D1 MPEG-2 when you build the project.

SD Projects

SD projects can use the resolutions shown in the following tables.

NTSC

All frame rates use the interlaced scanning method (as indicated with an "i"). With the exception of 352 x 240, all resolutions are MPEG-2 only.

Resolution	Frame rate	Aspect ratio	Notes
352 x 240	29.97i	4:3	Also known as SIF format; MPEG-1 or MPEG-2
352 x 480	29.97i	4:3	Also known as 1/2 D1
704 x 480	29.97i	4:3, 16:9	Also known as Cropped D1; 16:9 is anamorphic
720 x 480	29.97i	4:3, 16:9	Also known as Full D1; 16:9 is anamorphic

PAL

All frame rates use the interlaced scanning method (as indicated with an "i"). With the exception of 352 x 288, all resolutions are MPEG-2 only.

Resolution	Frame rate	Aspect ratio	Notes
352 x 288	25i	4:3	Also known as SIF format; MPEG-1 or MPEG-2
352 x 576	25i	4:3	Also known as 1/2 D1
704 x 576	25i	4:3, 16:9	Also known as Cropped D1; 16:9 is anamorphic
720 x 576	25i	4:3, 16:9	Also known as Full D1; 16:9 is anamorphic

HD Projects

HD projects can use the resolutions shown in the following tables.

Note: MPEG-1 video is not supported.

NTSC

Frame rates with an "i" indicate the interlaced scanning method; those with a "p" indicate the progressive scanning method.

Resolution	Frame rate	Aspect ratio	Notes
352 x 240	29.97i	4:3	Also known as SIF format
352 x 480	29.97i	4:3	Also known as 1/2 D1
704 x 480	29.97i	4:3, 16:9	Also known as Cropped D1; 16:9 is anamorphic
720 x 480	29.97i	4:3, 16:9	Also known as Full D1; 16:9 is anamorphic
720 x 480	59.94p	16:9	HD only, also known as 480p; is anamorphic
1280 x 720	59.94p	16:9	HD only, also known as 720p
1440 x 1080	29.97i	16:9	HD only; 16:9 is anamorphic
1920 x 1080	29.97i	16:9	HD only, also known as 1080i

PAL

Frame rates with an "i" indicate the interlaced scanning method; those with a "p" indicate the progressive scanning method.

Resolution	Frame rate	Aspect ratio	Notes
352 x 288	25i	4:3	Also known as SIF format
352 x 576	25i	4:3	Also known as 1/2 D1
704 x 576	25i	4:3, 16:9	Also known as Cropped D1; 16:9 is anamorphic
720 x 576	25i	4:3, 16:9	Also known as Full D1; 16:9 is anamorphic
720 x 576	50p	16:9	HD only, also known as 576p; is anamorphic
1280 x 720	50p	16:9	HD only, also known as 720p
1440 x 1080	25i	16:9	HD only; 16:9 is anamorphic

Resolution	Frame rate	Aspect ratio	Notes
1920 x 1080	25i	16:9	HD only, also known as 1080i

Picture Frame Rate

DVD Studio Pro NTSC projects support the NTSC frame rate (29.97 fps) and 23.976 fps assets that use NTSC video resolutions. PAL projects support the PAL frame rate (25 fps) and 23.976 fps assets that use PAL video resolutions. You can set a project's video standard in the General tab in the Disc Inspector or in the Project pane of DVD Studio Pro Preferences.

Warning: You cannot mix NTSC and PAL MPEG assets in a project.

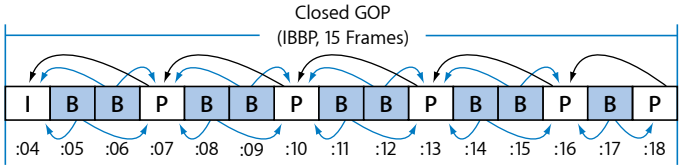
Working with GOP Settings

A major function of MPEG encoding is to identify redundancy not only within a frame, but also among a group of frames. A scene with no movement except a car driving by has a lot of redundancy over time. In this case, a single complete frame could provide the majority of the video; subsequent frames only need to provide for the areas that change. Each MPEG stream contains three types of frames that define the video. A Group of Pictures (GOP) setting defines the pattern of the three frame types used: Intra (I) frames, Bi-directional (B) frames, and Predicted (P) frames.

- *I-frames:* Also known as *reference* or *key* frames, I-frames contain the complete image of the current frame, without reference to frames that precede or follow it. The I-frame is the only type of MPEG frame that can stand by itself, without requiring information from other frames in the GOP. Every GOP contains one I-frame, although it does not have to be the first frame of the GOP. I-frames are the least efficient MPEG frame type, requiring the most disc space. Markers on a DVD track can be placed only at I-frames.
- *P-frames:* P-frames are encoded from a "predicted" picture based on the closest preceding I- or P-frame. P-frames are also known as *reference* frames, because neighboring B- and P-frames can reference them. P-frames typically require much less disc space than I-frames.
- *B-frames:* B-frames are encoded based on an interpolation from I- and P-frames that come before and after them. B-frames are the most efficient MPEG frame type, requiring the least amount of disc space. While a GOP can begin with a B-frame, it cannot end with one.

The goal of encoding video to MPEG is to reduce the video file size as much as possible while maintaining good quality. The B- and P-frames are what make MPEG so good at compressing video into such small files. Because they only contain information about what has changed in the images, they use much less disc space than I-frames.

There are three aspects to choosing a GOP setting: the GOP pattern, the GOP length, and whether the GOP is "open" or "closed."



GOP Pattern

The GOP pattern determines the ratio of P- to B-frames within a GOP. The most common patterns used for DVD are IBP and IBBP. All three frame types do not have to be used in a pattern; an IP pattern is also used in special circumstances.

IBP and IBBP GOP patterns, in conjunction with longer GOP lengths, produce the most efficient encodes. Smaller GOP patterns with shorter GOP lengths work better with video that has quick movements.

Some encoders can force I-frames to be added sporadically throughout a stream's GOPs. These I-frames can be placed manually by someone watching for sudden video changes or automatically by an encoder detecting scene changes. You can place markers in Final Cut Pro to identify specific frames to have an I-frame, either for use as a chapter marker or to manually identify high motion areas. See Adding Markers to Your Video for more information.

The integrated MPEG encoder uses a GOP pattern of IBBP.

GOP Length

Longer GOP lengths produce more efficient encodes by reducing the number of I-frames but are less desirable during short-duration effects such as quick fades and quick camera pans.

- *SD-Based DVDs:* The maximum GOP length for SD projects is 18 frames for NTSC or 15 frames for PAL. The minimum GOP length depends on the GOP pattern. For example, an IP pattern can have a length as short as two frames.

  The integrated MPEG encoder uses a GOP length of 15 frames for NTSC and 12 frames for PAL SD assets.

- *HD-Based DVDs:* Because HD projects can use both interlaced and progressive video assets, they have different GOP length maximums.
  - *NTSC interlaced assets:* 18 frames per GOP
  - *NTSC progressive assets:* 36 frames per GOP
  - *PAL interlaced assets:* 15 frames per GOP
  - *PAL progressive assets:* 30 frames per GOP

Note: 24p assets have their GOP structure based on their display rate, not the encoded rate. A 24p asset encoded to play in an NTSC project has a display rate of 29.97 interlaced frames (with an 18 frames per GOP maximum) or 59.94 progressive frames (with a 36 frames per GOP maximum).

The integrated MPEG encoder uses a GOP length of 15 frames for NTSC and 12 frames for PAL HD assets.

Open or Closed GOPs

An open GOP allows the B-frames from one GOP to look at an I- or P-frame from an adjacent GOP. Open GOPs are more efficient, but cannot be used with multi-angle or mixed-angle titles. A closed GOP keeps all references within itself, standing alone with respect to other GOPs. DVD Studio Pro works with either type in single-angle titles and requires closed GOPs with multi-angle and mixed-angle titles.

It is important to know that the same pattern can provide different results when used with an open or closed GOP. For example, the integrated MPEG encoder uses a closed GOP type, and it starts its IBBP pattern with an I-frame. Other encoders using an open GOP may start with a B-frame. In this case, starting with a B-frame is a little more efficient; if you start with an I-frame, an extra P-frame must be added to the end (a GOP cannot end with a B-frame).

General Quality Issues

The quality of the MPEG encoding determines the quality of the title. It is well worth putting some effort into getting the best possible MPEG encoding environment. For example, start with the best quality source material you can. An uncompressed digital source is the best, followed by a DV source, and then an analog Component source. Of the other analog formats, S-Video (Y/C) is much preferable to Composite.

Noisy Video

Because a large portion of MPEG's compression power depends on its ability to locate areas of the image that do not change between successive frames, "noisy" video can reduce the efficiency of MPEG encoding. While the actual video may be identical between two frames, if there are noise artifact differences between the two frames, they are detected as a change in video and require more bits to encode. A lot of noise causes poor encodes, because the encoding resources are tied up trying to faithfully reproduce the noise.

Transcoding Artifacts

Every time video is transcoded from one format to another—for example, from analog to digital, or DV to MPEG-2—artifacts are introduced into it. The visibility of these artifacts depends on the quality of the transcoding device and the content. While transcoding cannot be avoided, its effects can be minimized. Use the highest quality equipment and software you can, and choose products that work well together and support each other's formats.

Using the Integrated MPEG Encoder

When QuickTime assets that are not DVD-compliant are imported into a DVD Studio Pro project, they must be made DVD-compliant. DVD Studio Pro uses its integration with Compressor to encode these assets.

This integration with Compressor provides simplified encoding functionality, with the more advanced attributes automatically set.

Note: If you would like to encode the assets using more advanced Compressor functionality or to take advantage of distributed encoding, you can encode the assets directly in Compressor.

For video assets, the integrated MPEG encoder outputs an MPEG-2 video stream with a closed GOP pattern and a fixed GOP size (15 frames for NTSC and 12 frames for PAL). The exported MPEG video stream can be used for multi-angle tracks. The file type is ".m2v." See Settings in the MPEG-2 SD and MPEG-2 HD Tabs for information on configuring other aspects of the integrated encoder.

If the file to be encoded has audio multiplexed together with the video, the audio is encoded as a PCM audio file and given the same name as the video file, but with an ".aiff" extension.

See Preparing Audio Assets for more information on audio formats.

Transcoding with the Integrated MPEG Encoder

If you import a QuickTime asset whose video standard is different from the project's current setting, the integrated MPEG encoder automatically transcodes the asset to the project's video standard while encoding it. For example, if you are working on a PAL project and accidentally import an NTSC QuickTime file, the NTSC file is encoded as a PAL asset and is imported into the project. Similarly, if you import an HD asset into an SD project, the HD asset is automatically transcoded to SD.

You should be aware, though, that the integrated encoder uses the default Compressor Frame Controls settings (which control the quality of frame size and rate conversions), and the results you get may not be suitable for use in a project. Using Compressor directly or any of a variety of third-party products can provide good transcoding results. You may also choose to have a facility that specializes in video standards conversion transcode the video.

Configuring the Integrated MPEG Encoder

DVD Studio Pro Preferences contain the settings that determine how DVD Studio Pro uses the integrated MPEG encoder.

To configure the integrated MPEG encoder

1 Choose DVD Studio Pro > Preferences.

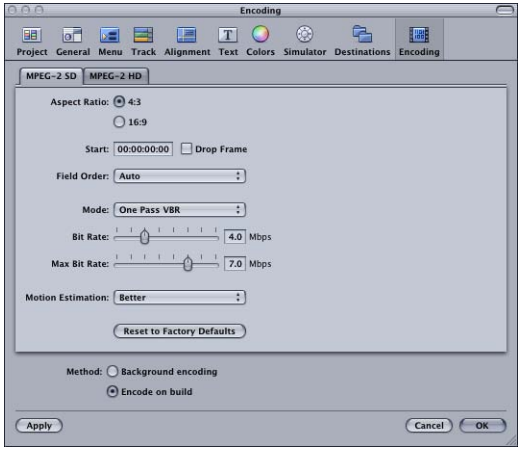
2 Click Encoding to open the Encoding pane.

3 Configure the settings in the Encoding pane. See Encoding Preferences for information about the options in this pane.

4 Click Apply to enable the settings, then click OK to close the Preferences window.

Encoding Preferences

The Encoding pane of DVD Studio Pro Preferences contains two tabs: MPEG-2 SD and MPEG-2 HD. Each tab has the same settings, with the exception of the higher bit rate settings allowed in the MPEG-2 HD tab.



The settings in the MPEG-2 SD tab are automatically applied to all QuickTime video assets added to an SD project (including those with an HD video resolution) and assets with an SD video resolution added to an HD project. The MPEG-2 HD tab's settings are applied to QuickTime video assets with an HD video resolution added to an HD project. (An exception are H.264 and HDV QuickTime assets, which are already properly encoded.)

Settings in the MPEG-2 SD and MPEG-2 HD Tabs

- *Aspect Ratio:* Select the aspect ratio to use.
  - *4:3:* This aspect ratio is only available for SD video assets.
  - *16:9:* This aspect ratio is supported by both SD and HD video assets. Note that selecting 16:9 does not convert the video to the 16:9 aspect ratio. The file to be encoded must already be in a 16:9 anamorphic format. See What Exactly Is a 16:9 Asset? for more information.

- *Start:* Sets the starting timecode of the encoded MPEG stream. This is most often set to match the timecode of the original video, ensuring that any timecode-based lists you have, such as a chapter list, marker positioning file, or subtitle file, match the encoded video.
- *Drop Frame:* Select this checkbox to use drop frame timecode for assets using the NTSC frame rate.
- *Field Order:* Choose the field order (Top or Bottom) that matches the video being encoded. This is also known as the *field dominance setting* in other products. Each interlaced NTSC and PAL video frame is comprised of two fields, each containing every other video line. The top field is also known as *field two*, *the upper field*, or *the odd field*. The bottom field is also known as *field one*, *the lower field*, or *the even field*.

  If the field order is set incorrectly, any motion in the video will appear very jagged when played back. Most professional and DV sources are field one dominant, and should use the Bottom setting. If you are unsure of the field order of your source video, choose Auto to let the encoder attempt to determine the field order.

  Note: The Field Order setting does not apply to progressive scan video.
- *Mode:* You can choose from three encoding modes, each with its own advantages and disadvantages.

  See MPEG Encoding Methods for more information on the encoding methods.

  - *One Pass:* With this option chosen, the encoder uses a one-pass encoding method with a constant bit rate (CBR). Note that the integrated MPEG encoder One Pass mode actually varies the bit rate a small amount.
  - *One Pass VBR:* With this option chosen, the encoder uses the one-pass variable bit rate (VBR) encoding method.
  - *Two Pass VBR:* With this option chosen, the encoder uses the two-pass VBR encoding method (one pass to create a motion profile of the video and a second pass to perform the encode).
- *Bit Rate:* Set the bit rate for the One Pass encoding method and the basic bit rate for the One Pass VBR and Two Pass VBR encoding methods. When using one of the VBR encoding methods, you cannot set Bit Rate any higher than 85% of the Max Bit Rate setting. See Choosing a Bit Rate for SD Projects for more information.
- *Max Bit Rate:* Set the maximum bit rate that can be used during a One Pass VBR or Two Pass VBR encode. You cannot set the Max Bit Rate setting lower than the Bit Rate setting or 5 Mbps (whichever is higher). Because the VBR methods are most effective when the maximum bit rate is about double the basic bit rate, or at least 1 to 3 Mbps higher than the basic bit rate, the Max Bit Rate setting is forced to be higher than the Bit Rate setting.

  Note: The Max Bit Rate setting does not affect the size of the encoded file—it only sets the upper limit that can be used during the encode.

- *Motion Estimation:* Choose a Motion Estimation setting that provides a balance between quality and speed of encoding. This setting controls how much time is spent determining the motion between video frames.
  - *Good:* The fastest Motion Estimation setting. This mode does well even with significant amounts of motion between frames, if the motion has minimal interfield motion within frames. For example, footage that has been exposed to frame-rate conversion or other effects processes tends to have little interfield motion. In general, use Good with the One Pass encoding mode.
  - *Better:* A good general purpose Motion Estimation setting. The Better mode provides good results even with complex interlaced motion. Better works well for almost all types of interlaced video sources, even shaky footage from hand-held consumer camcorders. In general, use Better with One Pass VBR and Two Pass VBR.
  - *Best:* This is the highest quality Motion Estimation setting and should be used for the most demanding and complex motion for interlaced sources. It is slower than the Better mode. In general, use the Best mode to maximize quality when using One Pass VBR or Two Pass VBR.
- *Reset to Factory Defaults:* Click this to restore the current tab's settings to the default settings.

Settings Outside of the Tabs

- *Method:* Select when you want the asset to be encoded.

  Note: An advantage of selecting "Background encoding" is that, once the assets are encoded, the encoded versions of them appear in the Simulator and the Viewer when playing a track. This makes it possible to see the video as it will appear on the DVD, and not the QuickTime version. See Is That the QuickTime or MPEG Encoded Version? for more information.

  - *Background encoding:* The encoding begins as soon as you import the asset. The encoding takes place in the background, allowing you to continue working on your project. A progress bar appears in the Status column of the Assets tab. Once the encoding process finishes, the Status column displays Done. See Default Columns in the Assets Tab for more information.
  - *Encode on build:* The encoding does not start until you complete your project and build the VIDEO_TS or HVDVD_TS files.

Using the Integrated MPEG Encoder

Depending on the Method setting in Encoding Preferences, video assets can either begin encoding as soon as you add them to your project, or they can wait until you perform a build of the project.

Is That the QuickTime or MPEG Encoded Version?

When you import QuickTime assets and assign them to elements in your project, it can be important to know whether you are seeing the original QuickTime version of the asset or the MPEG encoded version in the Viewer or Simulator. Seeing the MPEG encoded version has the advantage of allowing you to see the video as it will appear when the DVD is played. The disadvantage of seeing the MPEG encoded version is that the video must be encoded first.

The Method setting in the Encoding pane of DVD Studio Pro Preferences controls whether the encoded versions of the assets can be available while you are authoring the project. With "Background encoding" selected, you will be able to see the encoded versions of the assets as soon as they are encoded. With "Encode on build" selected, you will not be able to see the encoded versions until you build the project.

There are some guidelines DVD Studio Pro uses to determine whether to show the original QuickTime version of the asset or the MPEG encoded version:

- When you view an asset from the Assets tab in the Viewer, you will see the QuickTime version, whether the encoded version is available or not.
- When you view an asset from the Track Editor, you will see the encoded version (if available). This is also true when you view the track in the Simulator.
- When you view an asset in the Menu Editor, you will see the QuickTime version, whether or not the encoded version is available. This is also true when you view the menu in the Simulator.

When you import a QuickTime video asset into DVD Studio Pro, the current Encoding Preferences settings are assigned to it. If you change the Encoding Preferences settings after you have imported a QuickTime video asset, those changes are applied only to new assets you import—they are not applied to existing assets.

Verifying and Changing Encoding Settings

If your project contains a mixture of 4:3 and 16:9 assets or has some assets you want to encode differently than others, you must be sure to set the Encoding Preferences settings before you import the assets. You can use the Encoder Settings dialog to verify and change the encoding settings on assets that have been imported.

To change the encoding settings after importing an asset

Do one of the following:

- Select the asset and choose File > Encoder Settings (or press Command-E).
- Control-click the asset in the Assets tab, then choose Encoder Settings from the shortcut menu.

The Encoder Settings dialog appears with the same settings found in the Encoding Preferences pane, with HD projects getting an added Resolution setting.

When you have the "Background encoding" method selected and you make any changes in the Encoder Settings dialog, one of two things happens:

- *If you change the bit rate setting:* The current file, whether a complete or partially complete file, is left as is and the encoder starts encoding a new file. This allows you to compare the quality of the two bit rates. If you decide to continue the encoding of the partially completed file, you can set the bit rate (and all other settings, if you have made changes) to the value it used, and the encoder will continue encoding it.

  Note: If the encoded files are being written to the project bundle, they are deleted regardless of whether or not you change the bit rate setting.

- *If you do not change the bit rate setting:* The original asset is deleted, whether a complete or partially complete file, and a new encoded file is created. For example, if you want to see the difference between one-pass VBR and two-pass VBR encoding and want to keep the files from both encoding sessions, you need to rename or move the completed one-pass VBR encoded file before re-encoding with the two-pass VBR setting.

If you have the "Encode on build" method selected, these changes will apply once you build your project.

Encoding Settings in HD Projects

Because an HD project can use assets with a wide variety of video resolutions, the Encoder Settings dialog contains a Resolution pop-up menu that shows the asset's resolution. You are also able to change an asset's video resolution by choosing a setting from the Resolution pop-up menu.

SD resolution assets (720 x 480i and 720 x 576i) in HD projects can use a bit rate up to 15 Mbps. The Bit Rate setting in the Encoder Settings dialog will not go beyond 15 Mbps when an SD resolution is chosen.

Important: Encoding an asset at a resolution other than its native resolution may result in unacceptable artifacts appearing in the video.

How the Encoded Files Are Named

When you import QuickTime video assets into DVD Studio Pro, the integrated MPEG encoder names the encoded files as follows:

- The first half is the complete original filename, including its extension.
- The second half has three parts—the video standard (NTSC or PAL), the encoding bit rate (shown as a four-digit number), and the ".m2v" extension.

For example, if you import an asset named "Main Program.mov," use the NTSC standard and a bit rate of 5.5 Mbps, the MPEG-encoded filename will be "Main Program.mov_NTSC_5500.m2v."

Audio files created by the embedded AIFF encoder use the original filename with an added ".aiff" extension.

Encoding Video for Multi-Angle Tracks

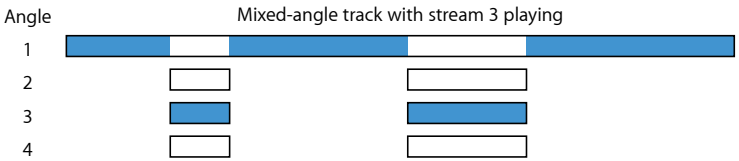
DVD Studio Pro supports multi-angle and mixed-angle video. With multi-angle video, a track can contain up to eight alternate video streams that last the entire length of the main stream (for a total of nine video streams per track). With mixed-angle video, the alternate streams do not last the entire length of the main stream, so you can have alternate streams in only those locations where they are needed, saving disc space. In either case, the viewer can switch among angles using the Angle button on the remote control.

Because different MPEG encoders can produce slightly different GOP structures, you should use the same encoder for all streams.

Note: Switching angles while playing a DVD affects only the video playback. The audio remains on the currently selected stream.

Considerations for Mixed-Angle Tracks

Mixed-angle tracks provide the possibility of interesting playback scenarios. The illustration below shows a track that has two sections with three alternate angles, with playback set to angle 3.



There are some additional considerations when creating a mixed-angle track:

- Within a track, you can use markers to define multiple sections to use additional angles, but each section must have the same number of streams. For example, you cannot have one section early in the track with two alternate streams and a section later in the track with three alternate streams—both sections must have either two or three streams.
- Each alternate angle section can be a different length, but all streams within a section must be the same length. For example, you can have one mixed-angle section early in the track that is 10 seconds long and a second mixed-angle section that is 20 seconds long. All alternate streams in the first mixed-angle section must be 10 seconds long; all alternate streams in the second mixed-angle section must be 20 seconds long.

- You cannot use still images in the V2 through V9 streams. You can use still images in the V1 stream as long as they are outside of the mixed-angle areas (places where video is present in the V2 through V9 streams).

Requirements for MPEG Streams in Multi- and Mixed-Angle Video

The integrated MPEG encoder produces streams that meet the criteria for multi- and mixed-angle use:

- With multi-angle tracks, all streams must be the same length. With mixed-angle tracks, all alternate streams in each mixed-angle section must be the same length.
- All streams must have the same resolution and frame rate.
- The length and pattern of GOPs (Group of Pictures) must be the same for all streams (angles). If you are not using the integrated MPEG encoder, use an encoder that allows you to turn scene detection off.
- All GOPs should be closed. You will not be able to cleanly switch between the streams if you use open GOPs.

Using Final Cut Pro and Compressor

In addition to the chapter and compression markers you can manually add to a video clip in Final Cut Pro and Final Cut Express, compression markers are automatically added at each edit point.

The manually added chapter and compression markers (also known as *named* markers) are processed by the integrated MPEG encoder and by Compressor when used directly. Be sure to add identically placed chapter and compression markers to each video clip you intend to use in a mixed- or multi-angle track.

The integrated MPEG encoder ignores the automatic compression markers, because they can alter the GOP structure and make the clip unusable for mixed- and multi-angle tracks.

You can either set Compressor to process the automatic compression markers or ignore them. The Extras pane of the Compressor MPEG-2 presets includes an "Include chapter markers only" checkbox. Select the checkbox to force Compressor to ignore the automatic compression markers if you are encoding clips for use in a mixed- or multi-angle track. See Using Compression Markers to Improve the MPEG Encode for more information about compression markers.

Maximum Bit Rates for Multi- and Mixed-Angle Tracks

The maximum bit rate for a multi- or mixed-angle track is different from other tracks. Due to the way the DVD specification requires video streams to be multiplexed together, the number of video streams determines the maximum video bit rate you can use. Following is a list of maximum combined bit rates (highest bit rate video stream + all audio streams + all subtitle streams) you can use for each multi- and mixed-angle track.

Important: When calculating the combined bit rate for a track, you only need to add in the bit rate of one video stream, but it needs to be the stream with the highest bit rate.

SD Projects

- *5 angles or fewer:* 8 Mbps maximum for the track's combined bit rate
- *6–8 angles:* 7.5 Mbps maximum for the track's combined bit rate
- *9 angles:* 7 Mbps maximum for the track's combined bit rate

HD Projects

- *2 to 9 angles:* 24 Mbps maximum for the track's combined bit rate

  Note: 1080i HDV video uses a bit rate of 25 Mbps, which is higher than the maximum allowable multi-angle bit rate. 720p HDV video uses a bit rate of 19 Mbps, which, depending on the number and type of audio and subtitle streams, can be used in a multi-angle project.

Adding Markers to Your Video

You can add markers to your tracks in the DVD Studio Pro Track Editor. You can use these markers in a variety of ways—the most common usage is to provide a place in a track to which a button on a chapter index menu can connect.

Apple video editing applications—Final Cut Pro and Final Cut Express—let you add markers while you edit the video. You can also add markers with Compressor. There are two types of markers that are important to DVD Studio Pro:

- *Chapter markers:* DVD Studio Pro can import these markers and display them in the Track Editor.
- *Compression markers:* The integrated MPEG encoder uses these markers to place custom I-frames in the MPEG-encoded file.

Because DVD Studio Pro can import chapter markers added within Final Cut Pro, Final Cut Express, and Compressor, you can choose to create the markers in the editing, compressing, or DVD authoring process. When you import video with chapter markers into DVD Studio Pro, you see the marker position and marker name you set appear in the Track Editor. The markers can then be edited within DVD Studio Pro exactly as if you had manually created them there.

Note: The markers embedded in MPEG files encoded with the DVD Studio Pro 4 version of the integrated MPEG encoder are not compatible with 1.X versions of DVD Studio Pro.

Placing Chapter Markers Exactly Where You Want Them

Adding markers in Final Cut Pro, Final Cut Express, or Compressor offers the potentially large advantage of allowing you to position them on the exact frame where you want them to appear.

When adding markers to a track in DVD Studio Pro, you can only place them at GOP boundaries. This means that you will often not be able to place them exactly where you want them. When you place the markers with a video editor, the integrated MPEG encoder automatically forces an I-frame at that position, placing a GOP boundary exactly at every marker and providing perfect marker placement. Markers placed in Compressor before it is used to encode the video are also perfectly placed.

Using Compression Markers to Improve the MPEG Encode

MPEG encoding is based on the placement of I-frames, P-frames, and B-frames within a GOP (see Working with GOP Settings). The I-frames encode a complete frame, while the P-frames and B-frames only encode the parts of the video that change between the I-frames. When there is a sudden change in the video content on a P-frame or B-frame, such as a cut to a new scene, the output of the MPEG encoder can have significant artifacts until it reaches the next I-frame.

The integrated MPEG encoder uses compression markers to force an I-frame into the encode at a specific frame, modifying the surrounding GOP structure to keep the encode DVD-compliant.

Adding compression markers at places in the video where sudden transitions occur can produce better MPEG encodes when you use the integrated MPEG encoder. You can manually place compression markers in Final Cut Pro and Final Cut Express. As with chapter markers, an I-frame is forced at their position. The difference is that compression markers do not import into DVD Studio Pro as chapter markers and do not count against the 99 chapter marker limit for a track.

Note: Final Cut Pro automatically adds compression markers at each edit point. These are not processed when encoding the video with the integrated MPEG encoder. Only compression markers you manually add in Final Cut Pro are processed. See Using Final Cut Pro and Compressor for information on these markers and Compressor.

About the Markers You Add in an External Editor

There are several issues to be aware of when adding chapter and compression markers in an external video editor:

- DVD tracks can support a maximum of 99 chapter markers. Because compression markers are only used in the MPEG encoding process, they do not count as chapter markers and do not count against the 99-marker limit. Because you can add several video assets to a single track in DVD Studio Pro, you must keep in mind that the 99-marker limit applies to the total markers of all assets on the track.
- You cannot place markers closer than one second to each other or within one second of the clip's start or end in the editor. This gives the encoder the flexibility to modify the GOP structures in that area to accommodate the added I-frame.

- If you are going to use a video asset to create a mixed-angle or multi-angle track, all video streams must have identical MPEG structures. If you add chapter or compression markers to one stream, you must add them at the exact same place in the other streams.

Adding and Configuring Markers in Final Cut Pro and Final Cut Express

Using Final Cut Pro or Final Cut Express, you can add markers to a clip or to a sequence. If you intend to export the markers for use with DVD Studio Pro, it is important that you place the markers correctly.

- *If you export a clip by selecting it in the Browser:* The chapter and compression markers can be exported.
- *If you export a sequence by selecting it in either the Browser or the Timeline:* Only markers in the sequence are exported—markers in any clips in the sequence are ignored.

For details on adding markers to clips and sequences, see the *Final Cut Pro User Manual*. The following instructions assume you are familiar with Final Cut Pro and Final Cut Express.

Note: The following instructions are for Final Cut Pro 4 through Final Cut Pro 5, and all versions of Final Cut Express. If you are using a different version of Final Cut Pro, you may have different choices.

To configure a marker in Final Cut Pro

1 Select the marker and open the Edit Marker dialog.

2 Enter a name for the marker.

This is the name that appears in the Track Editor in DVD Studio Pro and can be used as button text.

3 Click either Add Chapter Marker or Add Compression Marker.

Text is added to the Comment area.

Only chapter markers appear in DVD Studio Pro. Because each chapter marker forces an I-frame at that location, it is unnecessary for you to add both marker types.

To export a Final Cut Pro or Final Cut Express movie with markers

1 Do one of the following:

- *If exporting a clip with markers:* Select the clip in the Browser.
- *If exporting a sequence with markers:* Select the sequence in either the Browser or the Timeline.

2 Choose File > Export > QuickTime Movie.

The Save dialog appears.

3 Choose the type of markers to export from the Markers pop-up menu.

Choose DVD Studio Pro Markers to export both compression and chapter markers, or choose the type (compression or chapter) you want to export.

4 Ensure all other settings are correct, then click Save.

About H.264 Video

You can use the H.264 video format, also known as MPEG-4 part 10 and the Advanced Video Codec (AVC), in your HD projects. The H.264 encoder is twice as efficient as the standard MPEG-2 encoder. When compared to encoding with MPEG-2, this means that with the H.264 encoder:

- You can use a lower bit rate to get the same quality, resulting in smaller files.
- You can use the same bit rate and get better quality with the same file size.

While DVD Studio Pro does not include an embedded H.264 encoder, Compressor includes presets specifically for use in HD projects. You are able to modify these presets to suit your specific needs.

Important: You must use H.264 for HD DVD presets in Compressor to encode H.264 video assets for native use in DVD Studio Pro HD projects.

Natively Supported H.264 Formats

DVD Studio Pro natively supports the following H.264 formats. Native support means that the files are not reencoded when they are imported into the appropriate NTSC or PAL HD project. In some cases, however, frames may be set to repeat during playback to create the HD DVD specification's required frame rate.

NTSC HD projects natively support the following formats:

- 720p24
- 720p30
- 720p60
- 1080p24
- 1080p30

PAL HD projects natively support the following formats:

- 720p25
- 720p50
- 1080p25

H.264 Bit Rates

The process of choosing a bit rate for H.264 video is similar to choosing a bit rate for MPEG-2 video—the higher the bit rate the better the quality, but the more disc space that is required. In general, you are able to use lower bit rates than you would use with an MPEG-2 encoder.

While the maximum bit rates you can use are identical to MPEG-2 video, the minimum bit rates are lower.

Video format	MPEG-2 range	H.264 range
Standard definition	2.0 Mbps to 15.0 Mbps	0.5 Mbps to 15 Mbps
High definition	2.0 Mbps to 29.4 Mbps	1.5 Mbps to 29.4 Mbps

Important: It is strongly suggested that you use H.264 bit rates of 18 Mbps or less to ensure DVD compatibility.

H.264 Frame Sync Setting

The H.264 encoder in Compressor contains a Frame Sync setting. This setting defines how often the encoder places a key frame, similar to an MPEG-2 I-frame, in the stream. The value is in seconds, with one half second increments. The range is from 0.5 seconds to 5.0 seconds.

The smaller the Frame Sync value is, the more key frames are placed in the stream, which results in better quality but with a larger file size. Higher values result in a smaller file but with reduced quality.

The Frame Sync setting does not affect where you can place markers in the Track Editor. Due to the structure of the H.264 stream, you are able to place a marker about every half second.

About HDV Video

DVD Studio Pro natively supports many of the HDV video formats currently in use. Native support means that the files are not reencoded when they are imported into the appropriate NTSC or PAL HD project. In some cases, however, frames may be set to repeat during playback to create the HD DVD specification's required frame rate.

You can edit the following HDV video formats directly in Final Cut Pro and use them directly in your HD DVD Studio Pro projects without the need to transcode them.

Note: None of these formats are supported in SD DVD projects. For the best results, use Compressor to convert any unsupported HDV formats to supported HDV, MPEG-2, or H.264 formats. You can use Compressor to convert these formats (and any other HD-format video) to an SD format that you can use in your SD projects.

NTSC HD projects natively support the following formats:

- 720p24
- 720p30
- 720p60
- 1080p24
- 1080p30
- 1080i60

PAL HD projects natively support the following formats:

- 720p25
- 720p50
- 1080p25
- 1080i50

Note: You can import 24 fps and 23.98 fps HDV-format video into PAL projects, but they are not treated natively and are reencoded to a supported MPEG-2 format.

Using HDV Video from the Final Cut Pro Capture Scratch Folder

The HDV video clips that Final Cut Pro captures from some HDV sources cannot be imported directly into DVD Studio Pro. Only HDV video clips exported from Final Cut Pro are formatted correctly for use in an HD DVD project. When the clips are captured, they may not have legal opening and closing GOP structures. When HDV clips are exported from Final Cut Pro, the opening and closing GOP structures are made legal.

DVD Video Source Settings Summary

The following sections, DVD Video Settings for SD Projects and DVD Video Settings for HD Projects, summarize the required settings for MPEG and other sources that can be used with DVD Studio Pro.

Note: All assets within a project must use the same video standard (all NTSC or all PAL). For the other settings, such as encoding format, resolution, and bit rates, you can mix assets with different settings.

DVD Video Settings for SD Projects

The following settings work with SD projects. With the exception of MPEG-1 video, these same settings can also be used in HD projects.

MPEG Type

Both MPEG-1 and MPEG-2 are supported, at the video resolutions listed below.

MPEG Structure

Only elementary streams are supported.

MPEG Bit Rates

Multi-angle and mixed-angle tracks have stricter requirements. See Encoding Video for Multi-Angle Tracks for details.

- *MPEG-1 Video:* Up to 1.856 Mbps (1.15 Mbps is typical.)
- *MPEG-2 Video:* Up to 9.8 Mbps (The typical maximum used is 8 Mbps.)

Video Resolution

DVD Studio Pro supports a variety of resolutions. See Choosing a Video Resolution for more information.

- *MPEG-1:* The following resolution is supported:
  - *SIF (Standard Interface Format):* 352 x 240 NTSC; 352 x 288 PAL
- *MPEG-2:* The following resolutions are supported:
  - *SIF:* 352 x 240 NTSC; 352 x 288 PAL
  - *1/2 D1:* 352 x 480 NTSC; 352 x 576 PAL
  - *Cropped D1:* 704 x 480 NTSC; 704 x 576 PAL (matches analog blanking)
  - *Full D1:* 720 x 480 NTSC; 720 x 576 PAL

Frame Rate

There are three supported frame rates:

- NTSC with 525 lines (29.97 fps)
- PAL with 625 lines (25 fps)
- Versions of 23.976 fps video using either the NTSC or PAL video resolutions

Aspect Ratio

4:3 and anamorphic 16:9 are supported. (See What Exactly Is a 16:9 Asset?)

Chroma Format

The DVD specification requires a 4:2:0 chroma format.

GOP Size (Maximum)

18 frames NTSC; 15 frames PAL

GOP Size (Typical)

15 frames NTSC; 12 frames PAL

DVD Video Settings for HD Projects

The following settings work with HD projects.

MPEG Type

MPEG-2, HDV, and H.264 are supported, at the video resolutions listed below.

MPEG Structure

Only elementary streams are supported.

MPEG Bit Rates

Multi-angle and mixed-angle tracks have stricter requirements. See Encoding Video for Multi-Angle Tracks for details.

- *SD MPEG-2 Video:* From 2.0 Mbps to 15.00 Mbps

- *HD MPEG-2 Video:* From 2.0 Mbps to 29.40 Mbps (The typical maximum used is 27 Mbps.)

  Note: HD assets include the 480p and 576p resolutions.
- *HDV Video:* HDV video is MPEG-2 encoded. The bit rate depends on the video resolution:
  - *1280 x 720p:* 19 Mbps
  - *1920 x 1080i:* 25 Mbps

H.264 Bit Rates

Multi-angle and mixed-angle tracks have stricter requirements. See Encoding Video for Multi-Angle Tracks for details.

- *SD H.264 Video:* From 0.5 Mbps to 15.00 Mbps
- *HD H.264 Video:* From 1.5 Mbps to 29.40 Mbps (The typical maximum used is 27 Mbps.)

  Note: HD assets include the 480p and 576p resolutions.

Video Resolution

DVD Studio Pro supports a variety of resolutions. See Choosing a Video Resolution for more information.

- *SIF:* 352 x 240 NTSC; 352 x 288 PAL
- *1/2 D1:* 352 x 480 NTSC; 352 x 576 PAL
- *Cropped D1:* 704 x 480 NTSC; 704 x 576 PAL (matches analog blanking, only the interlaced version is supported)
- *Full D1:* 720 x 480 NTSC; 720 x 576 PAL (both interlaced and progressive versions)
- *720p:* 1280 x 720 (NTSC and PAL, progressive)
- *Anamorphic 1080i:* 1440 x 1080 (NTSC and PAL, interlaced, anamorphic 16:9)
- *1080i:* 1920 x 1080 (NTSC and PAL, interlaced)

Frame Rate

There are three supported frame rates:

- NTSC with 525 lines (29.97 fps)
- PAL with 625 lines (25 fps)
- Versions of 23.976 fps video using either the NTSC or PAL video resolutions

Aspect Ratio

4:3, anamorphic 16:9, and true 16:9 are supported.

Chroma Format

The DVD specification requires a 4:2:0 chroma format.

GOP Size (Maximum)

18 interlaced frames or 36 progressive frames NTSC; 15 interlaced frames or 30 progressive frames PAL

GOP Size (Typical)

15 frames NTSC; 12 frames PAL

Preparing Audio Assets

5

Before you can begin building a DVD project, you must have correctly prepared audio source material.

This chapter covers the following:

- Introduction to Preparing Audio Sources (p. 87)
- Audio Formats Not Supported by the DVD Specification (p. 88)
- Audio Formats Supported by the DVD Specification and DVD Studio Pro (p. 88)
- Using Multiple Audio Formats in Your Project (p. 91)
- Required Audio Formats for SD Projects (p. 91)
- DVD Audio Source Settings Summary (p. 92)

Introduction to Preparing Audio Sources

The DVD specification restricts the types of audio formats that you can include on a DVD. There are also restrictions on mixing audio of different types within a track or set of menus. There are also required audio formats to make a DVD-compliant disc.

Three areas in a DVD project can use audio sources:

- *Tracks:* This is the primary area that uses audio sources.
- *Slideshows:* This area can use a single audio source for the entire slideshow or individual audio sources for each slide. See Preparing Slideshow Assets for more information.
- *Menus:* This area uses audio sources when you are creating motion menus. For the most part, audio sources used for motion menus must follow the same rules as audio sources used for tracks. See Preparing Menu Assets for more information.

See DVD Audio Source Settings Summary for a complete list of settings required for an audio source to be DVD-compliant.

Audio Formats Not Supported by the DVD Specification

If you import an audio format that is not supported by the DVD specification, DVD Studio Pro automatically uses the embedded AIFF encoder to transcode the audio file into an uncompressed AIFF format file. For example, if you import an MP-3 file (a file format that is not supported by the DVD specification), DVD Studio Pro creates an AIFF file from the MP-3 file and that is what is used by your project.

Note: Because an AIFF file is not compressed, its file size will be substantially larger than the original MP-3 file. If disc space is an issue, you can use the AC-3 encoder in the Compressor application to transcode the AIFF file to the Dolby Digital AC-3 format. See Dolby Digital AC-3 Audio for more information.

Using AAC Audio Files from the iTunes Store

DVD Studio Pro is able to import and use AAC format audio files purchased from the iTunes Store as long as the computer you are using them on is authorized to use them. If you import iTunes Store files that the computer is not authorized to use, DVD Studio Pro plays silence when it encounters those files. Additionally, if you select and try to play an iTunes Store file that the computer is not authorized to play in the Audio tab in the Palette, DVD Studio Pro plays silence. As with MP-3 files, AAC files are converted to AIFF files.

Audio Formats Supported by the DVD Specification and DVD Studio Pro

The following audio formats are supported by the DVD specification and can be imported into DVD Studio Pro without using the embedded AIFF encoder.

- MPEG-1 Layer 2 audio
- Dolby Digital (AC-3) audio (mono up to six channels)
- DTS multichannel audio (preview not supported)
- PCM audio (pulse code modulation audio; used by the AIFF and WAVE formats)

Note: When importing DVD-compliant audio files, DVD Studio Pro imports only elementary files (not multiplexed). See Elementary and Multiplexed MPEG Files for more information.

Uncompressed PCM Audio

Uncompressed audio is typically referred to as *PCM*, although the files usually have a ".wav" or ".aif" extension. The DVD specification supports uncompressed PCM audio at sample sizes of 16 bits and 24 bits and sample rates of 48 kHz or 96 kHz. Audio in this format is completely compatible with DVD players worldwide and is of higher fidelity than data-compressed audio. The disadvantage of PCM audio is the relatively large file sizes, compared to compressed audio formats.

There are two common PCM audio formats:

- AIFF audio (Audio Interchange File Format-uncompressed PCM audio; the most common Macintosh audio format)
- WAVE audio (Windows uncompressed PCM audio; the most common Windows audio format, also referred to as WAV)

The DVD Studio Pro integrated MPEG encoder creates AIFF format files. In most cases, DVD Studio Pro converts WAVE files into AIFF files.

Compressed Audio Formats

The DVD medium uses data-compressed (as opposed to sonically compressed) audio for two purposes:

- To deliver discrete surround audio (5.1)
- To conserve bandwidth and disc space, allowing more room for video. This is especially applicable in long-form material such as feature films, notably when the smaller DVD-5 medium is the target.

Data-compressed audio for DVD comes in a few forms, described next.

MPEG-1 Layer 2 Audio

For DVD products in PAL, MPEG-1 Layer 2 audio is compatible with all players. For NTSC markets (North America, Japan), most (but not all) DVD players support playback of MPEG-1 Layer 2 audio. If you create NTSC titles using MPEG audio, be aware that there may be problems in playback on some players.

If you want to ensure that your data-compressed audio is compatible with all players for NTSC, using the AC-3 format is recommended. See the next section for information on encoding and authoring with AC-3 format audio.

Dolby Digital AC-3 Audio

There are two good reasons to use AC-3 format audio in your DVD production:

- To take advantage of 5.1 surround audio (five main speakers and a subwoofer—six channels of audio total), which is supported by AC-3 but not by MPEG-1 Layer 2
- To produce stereo data-compressed audio that is fully compatible with every DVD player in the NTSC markets of North America and Japan. You may run into some compatibility issues with older DVD players in PAL countries.

You can use the AC-3 encoder in Compressor to encode everything from stereo to 5.1 surround audio. See Previewing AC-3 and DTS Audio for information on listening to surround audio.

DTS Audio

DTS (Digital Theatre Systems) is an alternative format for surround audio. DVD Studio Pro can import and use DTS audio files.

DVD Studio Pro supports DTS ES audio that can have up to 6.1 channels as well as audio that uses either a 48 kHz or a 96 kHz sample rate and a 24-bit sample size.

Important: All DTS audio imported into DVD Studio Pro must use the compacted file format, with a ".cpt" file extension. Additionally, DTS audio using a 44.1 kHz sample rate will produce unusable results.

See Previewing AC-3 and DTS Audio for information on listening to surround audio.

Previewing AC-3 and DTS Audio

In most cases, the best way to verify AC-3 and DTS audio is to burn a disc that you can play on a DVD player with suitable audio support. If you play the audio on your computer using its built-in audio support, the following happens:

- When you play AC-3 audio from the Assets tab, one of the editors (Track, Story, Slideshow, or Menu Editor), or the Simulator, the audio is automatically converted to two-channel stereo for playback through your computer.
- Because there is no DTS decoder on your computer, you cannot hear DTS audio when played from the Assets tab, one of the editors (Track, Story, Slideshow, or Menu Editor), or the Simulator.

You are able to add an external AC-3 or DTS decoder to your computer to listen to your surround sound audio from the Assets tab, one of the editors (Track, Story, Slideshow, or Menu Editor), or the Simulator.

To configure DVD Studio Pro to use an external audio monitor

1. Choose DVD Studio Pro > Preferences.
2. Click the Simulator icon to show the Simulator preferences.
3. Choose your external audio monitor device from the Playback Output section's Audio pop-up menu.

   Common choices include Built-in Audio, for normal system audio, and Built-in Audio (S/PDIF), which uses your system's optical digital audio output (if available) to output the audio to an external AC-3 or DTS decoder.
4. Click Apply.

See External Video and Audio Monitoring for more information.

Another option is to build your project and use the Apple DVD Player. Similar to DVD Studio Pro, you can configure DVD Player to use an external audio monitor.

To configure DVD Player for external audio decoder support

1. Open DVD Player.
2. Choose DVD Player > Preferences.
3. Click the Disc Setup icon to show the Disc Setup pane.
4. Choose the external audio device to use from the Audio Output pop-up menu.
5. Click OK.

Using Multiple Audio Formats in Your Project

A project can contain audio in a variety of formats; however, there are some restrictions regarding mixing formats within an element or group of elements, such as menus.

When you are required to have the same audio format within an element or group of elements, all settings must be the same:

- *Audio type:* AIFF, WAVE, PCM, AC-3, or MPEG-1 Layer 2
- *Number of channels:* This is especially true with the AC-3 audio format, because it commonly supports a variety of channel configurations.
- *Sample size:* 16 bits or 24 bits
- *Sample rate:* 48 kHz or 96 kHz
- *Bit rate:* 64 kbps to 4608 kbps, depending on the audio type

Tracks

Each audio stream within a track can be in a different format. Within an audio stream, however, the audio format must be the same for all clips.

Menus

All menus within a video title set (VTS) must use the same audio format. DVD Studio Pro automatically creates additional VTS blocks as needed to support menus with different audio formats. See VTS Editor for additional information.

Slideshows

When adding individual audio clips to each slide or when using multiple audio clips for overall audio, all clips must use the same audio format.

Required Audio Formats for SD Projects

To ensure that a DVD will play on all SD-based DVD players, there is a DVD specification requirement that at least one stream of audio for each element be in a specific format.

- *For NTSC DVDs:* At least one of the audio streams must be either PCM or AC-3.
- *For PAL DVDs:* At least one of the audio streams must be either PCM or MPEG compressed audio.

Note: HD projects can use any supported audio format and do not require specific ones to be present.

DVD Studio Pro verifies your project during the build process to ensure it is DVD-compliant. The build log shows any issues that are found; however, the build will continue and you can write your project to disc.

DVD Audio Source Settings Summary

Following is a summary of the required settings for MPEG and other audio sources that can be used with DVD Studio Pro.

Note: All assets within a project must use the same video standard (all NTSC or all PAL). For the other settings, such as encoding format, resolution, and bit rates, you can mix assets with different settings.

DVD Audio Settings for SD Projects

The following settings work with SD projects. These same settings can also be used in HD projects.

Bit Rates

The audio bit rate depends on the format and quality level you need (higher bit rates provide better quality, but reduce the bit rate you can use with the video).

- *MPEG-1 Layer 2 Audio:* 64 to 384 kbps (192 kbps and 224 kbps are typical.)
- *Dolby Digital AC-3:* 64 to 448 kbps (192 kbps, 224 kbps, and 448 kbps [for 5.1] are typical.)
- *DTS ES:* 754.5 kbps or 1509.75 kbps
- *Stereo PCM @ 16 Bits/48 kHz:* 1536 kbps
- *Stereo PCM @ 24 Bits/96 kHz:* 4608 kbps

Audio Sample Rate

There are two supported audio sample rates:

- 16 bits or 24 bits
- 48 kHz or 96 kHz

DVD Audio Settings for HD Projects

The following settings work with HD projects.

Bit Rates

The audio bit rate depends on the format and quality level you need (higher bit rates provide better quality, but reduce the bit rate you can use with the video).

- *MPEG-1 Layer 2 Audio:* 64 to 384 kbps (192 kbps and 224 kbps are typical.)
- *Dolby Digital AC-3:* 64 to 448 kbps (192 kbps, 224 kbps, and 448 kbps [for 5.1] are typical.)

- *DTS ES:* 754.5 kbps or 1509.75 kbps
- *Stereo PCM @ 16 Bits/48 kHz:* 1536 kbps
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Audio Sample Rate

There are two supported audio sample rates:

- 16 bits or 24 bits
- 48 kHz or 96 kHz

Preparing Menu Assets

6

Before you can begin building a DVD project, you must have correctly prepared menu source material.

This chapter covers the following:

- Introduction to Preparing Menu Sources (p. 95)
- What Is a Menu? (p. 96)
- Creating a Menu (p. 96)
- Creating Graphics to Use in Menus (p. 97)
- Creating Overlays (p. 101)
- Creating a Layered Menu (p. 106)
- Creating Video for Motion Menus (p. 106)
- Defining the Menu Loop Point (p. 107)
- Creating Shapes (p. 108)
- Creating Graphics for Drop Zones and Buttons (p. 112)

Introduction to Preparing Menu Sources

This chapter describes the various components, such as backgrounds, overlays, buttons, and drop zones, and strategies you can use to create menus in DVD Studio Pro.

The types of menu sources you need for your DVD project depend on the types of menus you want to use:

- Will the backgrounds be still images or contain full-motion videos?
- Will you use the provided shapes for your buttons or create your own?
- Will you use the standard method of creating menus or the layered method?

Before you can know how to prepare your menu sources, you need to understand how DVD Studio Pro uses them. Following is an overview of what makes up a menu and how menus are used.

What Is a Menu?

Most DVD-Videos have at least one menu. The menu allows the viewer to choose what to see. If no choices need to be made, such as with a looping movie at a sales kiosk, the disc can be configured to immediately begin playing the movie, and no menu is required.

For DVDs that have a number of viewing options—such as multiple movies, chapter selections, and bonus items—menus that are clear and logical can greatly enhance the viewing experience. Menus that are cluttered, clumsy, and confusing may cause viewers to become frustrated and give up trying to watch the title.

A menu consists of a background and one or more buttons. The background can be a simple still image or a full-motion video (a *motion menu*). The background may or may not contain content that relates to the buttons; it may be a scenic mountain view or a multilayered graphic including images for each button. Some menus may also have audio.

Creating a Menu

Creating a menu involves two basic steps: selecting the background graphic or video, and setting up the buttons. Selecting the background graphic or video is fairly simple; the only challenge is when you use multilayer Photoshop files. Setting up the buttons involves identifying where they are located by drawing boxes over them, and then setting up their actions (what happens when they are activated) and the colors to display for their different states.

DVD Studio Pro gives you two ways to create menus: the standard method, which uses overlays and allows you to use shapes, templates, and add text; and the layered method.

- *The standard method:* The standard method is usually preferred. It is the most flexible, allowing you to mix overlays with shapes, to use either stills or videos as the menu background, and to include audio. You can also use the templates and styles included with DVD Studio Pro for quick and consistent menu creation.
  - For more information on overlays, see Creating Overlays.
  - For a description of shapes, see Creating Shapes.
  - For information on the templates and styles feature, see Using Templates, Styles, and Shapes to Create Your Menus.
  - For information on motion menus and setting the loop point, see Creating Video for Motion Menus.
- *The layered method:* The layered method uses layers in a Photoshop (PSD) file to describe each button's possible states. Layered menus can also use overlays in addition to the Photoshop layers. This method cannot be used with motion menus and cannot include audio.
  - For more information on overlays, see Creating Overlays.

- For a description of creating layered menus, see Creating a Layered Menu.

An easy source for menu backgrounds are frames grabbed from a track's video. By setting a marker on the frame you want, you can choose to save that frame as a TIFF file that can then be imported and used as a menu background. You can also open the file in a graphics program and add effects and text before using it as your menu's background. See Grabbing a Still Image from Your Movie for more information.

Creating Graphics to Use in Menus

When creating graphics for menus, you need to be aware of several considerations. Some of these apply to all menu types, and some are specific to certain menu types, such as layered menus, menus with a still background, or menus using an overlay.

Using Your Graphics Program

DVD Studio Pro is designed to import a wide variety of graphics formats, allowing you to use almost any graphics program to create the menus and overlays.

Supported formats include:

- Adobe Photoshop PSD files
- PICT format files
- BMP format files
- JPEG format files
- QuickTime image files
- Targa (TGA) format files
- TIFF (TIF) format files

Additional support is also included for files that conform to the Adobe Photoshop (PSD) format. DVD Studio Pro can recognize individual layers and allows you to assign them to separate functions in a menu. You can even use the same file for several menus by selecting the appropriate layers to use for each menu.

- *Layers for standard overlay menus:* When creating graphics for standard overlay menus, you can select the layer (or layers, as is often the case) to use as the background and the overlay. In this way, a single file can be used in several menus, even sharing elements (such as a background image). To avoid confusion, assign clear names to each of the layers.
- *Layers for layered menus:* When creating graphics for use as layered menus, in addition to the layer (or layers) that make up the background, you must create at least two layers for each button, one showing the selected state and the other showing the activated state. To show the normal state of each button, you can either build it into the background layer or create a third layer.

Tips for Creating Menu Graphics

Most of the following tips apply to all graphics programs. Several apply specifically to Adobe Photoshop, although similar issues may exist in other graphics programs.

- Make horizontal lines a minimum of three pixels thick so they won't flicker on TV screens. For the same reason, avoid using typefaces with narrow lines. Serif fonts tend to be more prone to flicker than sans serif fonts.
- Be sure to use a filter that constricts the colors in the graphic to NTSC or PAL color space. To support broadcast bandwidths, NTSC and PAL video must use colors that are substantially limited compared to those your graphics program can create. Highly saturated colors create the biggest problems and produce the biggest disappointments when viewed on a video monitor.
- Photoshop's effects layers, transfer modes, and layer styles do not work with DVD Studio Pro. Be sure to flatten any of these before using them in DVD Studio Pro.

Flattening a Photoshop Layer

When creating graphics within Adobe Photoshop, you may want to add effects such as bevels, glows, and shadows to a layer, use the transfer modes, or configure layer styles. These Photoshop effects and modes are not supported by DVD Studio Pro. However, you can "flatten" them in Photoshop so that they appear in DVD Studio Pro.

Note: Flattening effects is not the same as using the Flatten Image command, which combines all contents of all layers of a Photoshop file (including effects) into a single layer.

It's a good idea to use this procedure on a copy of the original file, just in case something goes wrong.

To flatten a layer of a Photoshop file

1. Add a new empty layer immediately below the layer with the effects you want to flatten.
2. Either merge or stamp the layer with the effects into the empty layer. Merging deletes the effects layer, and stamping leaves the effects layer in place (which can be a good idea if you need to make changes to the layer later on).
   - *To merge the layer:* Select it and choose Layers > Merge Layers (or press Command-E).
   - *To stamp the layer:* Select it and press Command-Option-E.

A bitmap image of the effects layer is placed in the new layer.

Understanding Pixel Differences in Graphics and Video

The term *square pixel* actually refers to the horizontal and vertical distance from a pixel to its neighbors. With a square pixel, the distance is the same in both directions. This distance is a function of the sampling rates, both horizontal and vertical, and the aspect ratio the graphic will be displayed in. Given the right aspect ratio, virtually any combination of horizontal and vertical sampling rates could produce square pixels.

Computer graphics programs are optimized to work with square pixels: When you draw a square, it has the same number of pixels in all four of its sides and looks like a square on the display.

Unfortunately, SD video is different.

Video Pixels

Standard definition video uses a 4:3 aspect ratio. No matter what the size of the display, the height is always 75 percent of the width. This is true for both NTSC, which has 525 lines in each frame (480 of these active with DVDs), and PAL, which has 625 lines per frame (576 active). Both standards also have 720 pixels per line when converted to MPEG.

To fit the 4:3 aspect ratio perfectly using square pixels and 720 pixels per line, there would have to be 540 lines in each frame. So for NTSC, which has 480 lines, the lines must be spaced slightly apart to fill the same area, resulting in rectangular pixels. For PAL, with 576 lines, they must be squeezed together slightly to fit.

The Settings pop-up menu in the DVD Studio Pro Menu Editor has a square/rectangular pixel selection that allows you to choose whether to view menu graphics as rectangular pixels (forcing a 4:3 aspect ratio) or as square pixels while creating menus. The Viewer tab also has the same settings. The Simulator always shows rectangular pixels, simulating what the viewer will see.

The real problem arises when you create your menu graphics.

Square Pixels in Graphics

Graphics programs use square pixels. If you set the dimensions of a graphic to 720 x 480 pixels (the NTSC frame size), you will notice that the drawing area of the graphic in the graphics program is not a 4:3 aspect ratio (it is a bit short). If you set a graphic to PAL dimensions (720 x 576 pixels), the drawing area you see in your graphics program is taller than 4:3.

Anything you put in the graphic will be distorted (either vertically stretched or compressed, depending on your video standard) when viewed on a video monitor. If you draw a square, it will look like a rectangle. In some cases, the distortion is not great enough to worry about, but in most cases you should build your graphics with the distortion in mind.

To compensate for pixel differences between graphics and video, you need to build the graphics at one size and then rescale them to the appropriate video dimensions, as shown in the following table.

Aspect ratio	Starting dimension	Rescale dimension
NTSC 4:3	720 x 534 pixels	720 x 480 pixels
NTSC 16:9	864 x 480 pixels	720 x 480 pixels
PAL 4:3	768 x 576 pixels	720 x 576 pixels
PAL 16:9	1024 x 576 pixels	720 x 576 pixels

Important: While DVD Studio Pro automatically rescales graphics that use the starting dimensions above, it is strongly recommended that you rescale the graphics in your graphics program. (Graphics that already use the rescale dimensions are imported without any rescaling.) If you rescale the graphics in your graphics program, they will appear distorted in the graphics program but will be correct when viewed in DVD Studio Pro as rectangular pixels.

Using Later Versions of Adobe Photoshop

Later versions of Adobe Photoshop, including the CS versions, have presets that automatically set Photoshop to display the graphic with 4:3 or 16:9 aspect ratios using nonsquare pixels. Even better, these presets include title and action safe guides. For SD assets, these presets include:

- NTSC DV 720 x 480 (with guides)
- NTSC DV Widescreen 720 x 480 (with guides)
- PAL D1/DV 720 x 576 (with guides)
- PAL D1/DV Widescreen 720 x 576 (with guides)

You can turn this feature off by choosing View > Pixel Aspect Ratio Correction (a checkmark next to this indicates when the feature is active).

Note: See Shape Aspect Ratios for information on how DVD Studio Pro works with graphics used in shapes, buttons, and drop zones.

HD Video Pixels

There are a variety of video resolutions supported by HD projects:

Resolution	Square pixels	Starting dimension	Rescale dimension
480p (NTSC; 16:9)	No (anamorphic)	864 x 480 pixels	720 x 480 pixels
576p (PAL; 16:9)	No (anamorphic)	1024 x 576 pixels	720 x 576 pixels
720p (NTSC, PAL; 16:9)	Yes	1280 x 720 pixels	1280 x 720 pixels
1080i (NTSC, PAL; 16:9)	Yes (anamorphic)	1920 x 1080 pixels	1440 x 1080 pixels

Resolution	Square pixels	Starting dimension	Rescale dimension
1080i (NTSC, PAL; 16:9)	Yes	1920 x 1080 pixels	1920 x 1080 pixels

Note: HD projects can also use SD assets, which should use the same starting and rescale dimensions as in SD projects.

For the 480p and 576p resolutions, you use the same process that you would use with NTSC 16:9 and PAL 16:9. The 720p and the non-anamorphic 1080i resolutions both use square pixels. The anamorphic 1080i resolution is based on square pixels that are rescaled to 1920 x 1080.

Note: Later versions of Adobe Photoshop include presets with guides for most of these HD resolutions.

Important: You should always try to have the menu's resolution match the resolution of the items it links to. This includes the two versions of 1080i (anamorphic and non-anamorphic). A noticeable hesitation can occur during playback because HD playback equipment needs to change its resolution to match each asset.

Creating Overlays

As viewers use the arrow buttons on the DVD player's remote control to cycle through the buttons on a menu, they need some sort of indication as to which button is currently selected. If they activate the button, they need an indication of that, too. An overlay's primary function is to show the viewer which button is currently selected or activated.

Note: If you intend to use shapes for your menu buttons, you do not need to create overlays.

Overlays are still images that contain the graphics used to show each button's three states (normal, selected, and activated). One overlay file contains all of the buttons. Part of the menu creation process in DVD Studio Pro is to identify each button and set its function.

The overlay is almost always used in conjunction with the background image. For example, the normal button art may be in the background, while the overlay supplies only the selected and activated highlights, such as a halo or checkmark.

About Simple and Advanced Overlays

DVD Studio Pro allows you to choose whether to work with simple overlays that use a single overlay color, or advanced overlays that use up to four colors. Simple overlays are easier to create and configure but are not as flexible when creating complex menus. Advanced overlays give you the ability to use multiple colors for a button's selected and activated states.

About the Overlay Colors

Overlays can contain up to four colors. A peculiar feature of overlays is that the colors used to create them are not the colors that are displayed when viewers see the menu. The overlay only identifies the areas on the screen where highlights are to be applied—not the color or transparency of the highlights. You define the actual colors viewers see when you create the menu.

When you use the simple overlay method, everything in the overlay graphic must be one of two colors: the white background that is set to be transparent and the black highlight graphic to which you assign a color and transparency. If you add an element to the overlay that has a soft glow around it or has been anti-aliased, the areas of the element that are not white or black will appear with additional highlight colors (controlled by the advanced overlay color mapping settings). In this case, you should either correct the graphic or use the advanced overlay method which allows you to control all of the highlight colors.

The elements in an advanced overlay use up to four different colors. This gives you the ability to use multiple highlight colors for a button or create pseudo-soft edges and to take advantage of anti-aliased edges. See Creating Advanced Overlays for more information.

About Overlay Files

Whether you create simple or advanced overlays, the overlay must be a single flattened layer, either as part of a Photoshop (PSD) format file or as a separate file.

It is common to have a single PSD file supply both the menu's background and overlay. The DVD Studio Pro Menu Editor allows you to select as many layers as you want to use as the background, but you can only select a single layer as the overlay.

Note: Don't confuse a PSD file with layers (used to supply the background and overlay) with the type of PSD file used when creating layered menus. Standard menus contain all buttons' selected and activated states within a single layer of the file; layered menus contain a separate layer in the PSD file for each button's state (normal, selected, and activated). These layers are not overlays that you assign colors to—they are full-color images of the button in one of the three states. See Creating a Layered Menu for more information.

Creating Simple Overlays

With simple overlays, you must use only white and black to create the graphics.

To create a simple overlay

1. Create a full-screen white background.

   See Square Pixels in Graphics for information on the frame size to use.

2. Choose black and add the highlight elements to the background.

Be sure to disable anti-aliasing and avoid using soft edges. Depending on your graphics application, choose to use a 1-bit or bitmap mode.

3 Depending on the graphics application you use, you may need to flatten the overlay elements into a single layer.

Creating Advanced Overlays

To create advanced overlays, you first need to understand how they are used and the difference between the chroma and grayscale methods.

The Four Colors in an Advanced Overlay

When creating an advanced overlay, you create your highlights by using up to four specific colors. You can use a chroma method (using red, blue, black, and white as the four overlay colors) or a grayscale method (using black, dark gray, light gray, and white as the four overlay colors). You don't have to use all four colors when creating an overlay, but you will most likely use at least two.

Is White 0% or 100%?

Depending on your graphics background, you may assume white to be either 0% or 100%, with black being the opposite (100% or 0%, respectively). Previous versions of DVD Studio Pro considered white to be 0%, while most video people would consider white to be 100%. For the purposes of creating the light gray and dark gray colors used by the grayscale method, you need to use the following values:

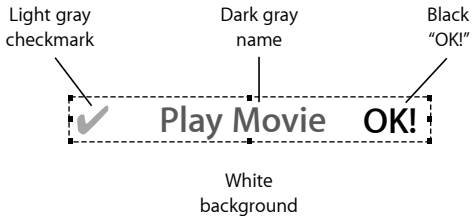
- *If you consider white to be 0%:* Use 33% for light gray and 66% for dark gray.
- *If you consider white to be 100%:* Use 66% for light gray and 33% for dark gray.

White is commonly used as the overlay's background color. When creating the menu, white's transparency is usually set to 0. Any of the other three overlay colors can be used for any aspect of the overlay.

For example, if you had a menu background with a group of buttons that were actually just text, such as "Play Movie" and "Select Chapter," initially your overlay would start as all white. If you wanted the button text to change to green when each button was selected, you'd need to add the text to the overlay and make it an overlay color such as light gray (or dark gray or black—remember that you will set the green color as the "selected" highlight color when you create the menu in DVD Studio Pro). If you wanted the text to change to orange when each button was activated, you wouldn't have to do anything more to the overlay—you would just set the "activated" highlight color to orange when you created the menu.

If you also wanted a checkmark to appear next to each text button as it was selected, but you wanted the checkmarks to be yellow when they were selected, you'd need to add the checkmarks to the overlay graphic and set them to be a different overlay color than the text (in this case, dark gray) so that you could apply a different highlight color (in this case, yellow).

In the same way, you could add the word "OK!" after each text button and show it only when the button was activated. Simply add the text to the overlay and set it to be black; in DVD Studio Pro, you can set black to be transparent for the normal and selected states but visible with a green color in the activated state.



To create an advanced overlay

1. Create a full-screen white background. See Square Pixels in Graphics for information on the frame size to use.

   Note: You don't have to use white as the background color, as you do with simple overlays, but it is a good idea to use white, because the default color mapping settings assume it is the background.

2. Depending on whether you intend to use the chroma or grayscale method, add elements using the three leftover overlay colors (white having been used for the background).

3. Depending on the graphics application you use, you may need to flatten the overlay elements into a single layer.

   If you use colors other than the four that are specified by the method you chose (chroma or grayscale), they are mapped to their closest equivalent when you use the overlay. In many cases, this produces surprising (but not useful) results.

   Note: Following is the mapping used for each overlay color with the grayscale method: 100% to 80% is white, 79% to 58% is light gray, 57% to 32% is dark gray, and 31% to 0% is black.

Pseudo-Soft Overlay Edges

Instead of using the advanced overlay's four colors to create multiple color highlights, you can use them to create pseudo-soft edges and take advantage of anti-aliased graphics. This requires you to use the grayscale method, using either white elements on a black background or black elements on a white background. The soft or anti-aliased edges are mapped to the dark and light gray overlay colors. By mapping the same color to each overlay color, but at reduced opacities on the dark and light gray overlay colors that occur at the edges, you can effectively simulate soft or anti-aliased edges.

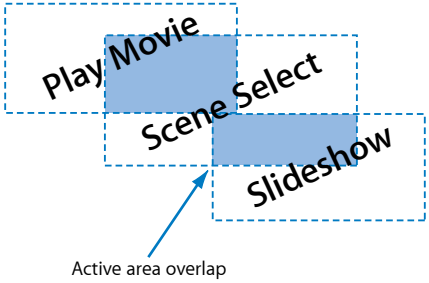
Keeping Each Button's Elements Together

When creating your menu in DVD Studio Pro, you draw a single box around all of the elements for each button. The box identifies that button's *highlight area*. In the above example, you would draw a box around each button that includes its checkmark, the main text, and the word "OK!" When you draw this box, no parts of any of the other buttons should be included, or they will also appear with this button.

For example, instead of having an "OK!" after each line, you might want a single large "OK!" on the right side. There's no way to draw a box that would include both the button name ("Play Movie," for example) and the large "OK!" without including some of the other button text, making this arrangement unusable.

Note: The Menu Editor has three color mapping sets that, in some cases, you can use to work around this problem. See Understanding Color Mapping for more information.

You also need to make sure none of the boxes overlap, because this can cause navigation problems, especially when using a pointer to select the buttons while playing the disc on a computer.



Creating a Layered Menu

Layered menus can provide greater flexibility in showing a button's selected and activated states, compared to standard overlay menus. In addition to the background image (which may contain the buttons in their normal states), a layered menu has two separate layers for each button (or three, if the button's normal states are not part of the background). For example, a menu with 12 buttons would need 24 layers just to show the selected and activated states of each button, plus 12 more if their normal state is not part of the background. (A Photoshop file can have up to 99 layers.)

There are several issues to be aware of when deciding whether to use layered menus:

- You cannot add an audio stream to them.
- You cannot include a full-motion video in them.
- When viewers make selections, they will notice a slower reaction time to button presses.
- Layered menus can also use overlays in the same way that standard menus do.

Using the Photoshop Layers

When you configure a PSD file for use as a layered menu, you select the layer or layers that provide the menu's background. The background can include all of the buttons' normal state, but it doesn't have to. If the background includes the normal state, the selected and activated states must be configured to take into account that the normal state is always present. If you want the button to change significantly when switching to the selected and activated states, you may need to have the normal state on its own layer so that it can be hidden when the other states appear.

Using PSD Files to Create Layered Menus

There are some issues to be aware of when using PSD files to create layered menus:

- Each button's active area is created the same way as it is when you work with overlays. This means you need to be able to draw a single box around each button's elements. See Keeping Each Button's Elements Together for more information.
- In addition to the layered buttons, you can use overlay-based buttons. The overlay can be another layer in the PSD file or a separate file.

Creating Video for Motion Menus

The video used for motion menus must follow the same DVD-compliance rules as video used in tracks. There are a few additional considerations you should be aware of:

- If you add any shapes, text items, or drop zones to a menu, the menu will be rendered when you build the project. See About Menu Rendering for more information.

  Important: If you know your menus will need to be rendered, you should avoid using highly compressed video (MPEG-2 for example) as the background video because it will get compressed again, potentially with visible artifacts.

- If you want to include button art beyond the capabilities of what an overlay can provide, you need to edit these over the video with an application such as Motion or Final Cut Pro. You can create the button art and associated overlay with your graphics program, then superimpose the button art over the video with your video editor, and use the overlay in DVD Studio Pro to set up the buttons.

  Note: An alternative is to use shapes to provide buttons over motion video.

- You can set the video to loop once it reaches its end. There will be a short pause in the playback as the menu moves from the end back to the beginning. This can be minimized or eliminated by carefully selecting the video to use. For example, a car driving by a mostly static background can be looped cleanly. If you are creating an animation for use as the background, be sure to keep looping in mind.
- Don't create excessively long video for motion menus. The videos can take up a lot of disc space, and if you use a lot of them, you can have problems building your title. See Standard SD DVD Video Zone Files for menu size limitations.
- Menus in SD projects can only use full-frame MPEG-2 video as a background. If you use an MPEG-1, 1/2 D1 MPEG-2, or a cropped D1 MPEG-2 file as the background, it will be encoded to full D1 MPEG-2 when you build the project. Menus in HD projects can use either full D1 MPEG-2 video or any of the supported HD video resolutions as the background.

Defining the Menu Loop Point

When you configure a looping menu, you have the option of setting the loop point (the point playback jumps to once the end of the menu's video is reached) to be different than the menu's first frame of video. For example, the menu's video may have an introduction that plays before the buttons become active—you would not want the introduction to play each time the menu loops.

In addition to setting the loop point manually in the Menu Inspector, you can add a chapter marker, named "MenuLoopPoint," to the background video while you are editing it in Motion or Final Cut Pro. DVD Studio Pro automatically sets the menu's loop point to match this marker when you assign the video to the menu's background using one of the dragging methods, such as dragging the video to the Menu Editor and choosing Set Background from the Drop Palette. See Configuring Motion Menu Settings for more information.

In Final Cut Pro, you add the chapter marker exactly as you would add a chapter marker for use in a track. The only requirement is that it be named "MenuLoopPoint." See Adding Markers to Your Video for more information. In Motion, you need to select the Menu Loop Point option when you add the marker to the video. See the Motion documentation for more information.

Creating Shapes

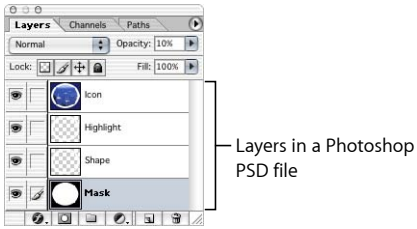
Shapes provide an easy way to create a standard menu using a simple background image (still or moving) without an overlay. These shapes can be either the ones supplied with DVD Studio Pro or shapes that you create.

Shapes can be used for buttons and for drop zones. (Drop zones are graphic elements that get added to the menu background and have no effect on the buttons.) You can position the shapes and change their size freely, and even have full-motion video play in them (motion buttons).

See Adding Shapes to a Menu for information on using shapes with the Menu Editor. See Importing a Shape for information on importing shapes into the Palette.

Creating a Shape

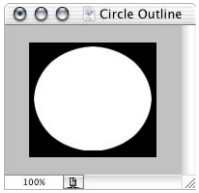
A shape is a Photoshop PSD file with up to four layers. DVD Studio Pro uses the layer order to determine which layer serves each function.



- *First (bottom) layer:* Contains the mask for the thumbnail image used when you assign an asset to a button or drop zone. This layer should have a grayscale image to control the thumbnail's appearance. White areas are completely opaque (you see all of the thumbnail image), gray levels are partially transparent, and black levels are completely transparent (you see none of the thumbnail image). The mask can use an irregular shape—the asset is scaled to fill it completely. Any part of the asset that falls outside the mask then gets removed. If you don't want a thumbnail image, you must still have this layer present, but you can draw a black square or any simple image.

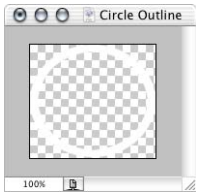
  When you activate drop shadows on a button or drop zone using a shape, DVD Studio Pro uses this layer, along with the second layer, to define the shape of the drop shadow.

Note: If you make the image mask layer (the first layer) of a shape the same size as the shape's graphics layer (the second layer), you may see some of the mask layer around the edges of the graphics layer. This is because the shape's graphics layer is processed differently than the mask layer. You can work around this issue by making the mask layer slightly smaller than the graphics layer.



- *Second layer:* Contains the shape's visible graphic. When used as a button, this is the layer that determines how the button looks in its normal state. DVD Studio Pro uses the RGB values for the shape. See Setting a Shape's Opacity if you want this layer to be partially transparent. Be sure to flatten any effects you apply to the layer. (See Flattening a Photoshop Layer for details.) Because this layer has a higher priority than the first layer, it must provide a "window" to the thumbnail mask (if used).

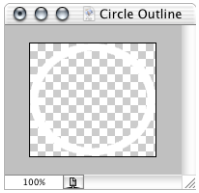
  When you activate drop shadows on a button or drop zone using a shape, DVD Studio Pro uses this layer, along with the first layer, to define the shape of the drop shadow.



- *Third layer:* Contains the highlight mask. This layer defines where the highlight colors appear when you use the shape as a button and the button is selected or activated. The actual image color does not matter, because it is this layer's opacity that defines the highlight, with 100% opacity selecting the black highlight color and 0% selecting the white highlight color.

  This layer is ignored if you use the shape in a drop zone.

Important: If you use this layer's opacity to create pseudo-soft or anti-aliased edges or to have multiple highlight colors appear at once, you can only use the shape in menus set to use the advanced grayscale overlay method. In these cases, the opacity values map to the overlay colors as follows: 100% maps to black, 99% to 67% maps to dark gray, 66% to 17% maps to light gray, and 16% to 0% maps to white.



- *Fourth layer:* Contains the shape's icon, which appears in the Shapes tab in the Palette and shape selector in the Button and Drop Zone Inspectors. This is an optional layer—the second layer provides this function if this layer is not present. The disadvantage of using the second layer is that often the shape alone does not provide a good indication of what the button will look like once you assign an asset to it. DVD Studio Pro uses the RGB values for the icon.

  Note: Do not include the fourth layer in the file unless you are adding a graphic to be used as the thumbnail. Adding an empty fourth layer results in a shape that you cannot use in DVD Studio Pro.

Setting a Shape's Opacity

DVD Studio Pro does not use the opacity settings you can apply to the layers within Photoshop. As a result, you cannot use the second layer's opacity setting to control the transparency of the shape's visible graphic. As an alternative, you can use Photoshop's merge capability to get the desired effect.

To set a shape's opacity

1. Create the shape in Photoshop as usual.

   It's a good idea to save the shape at this point so that you can go back to it if you later need to adjust the opacity or content.

2. Set the opacity for the second layer (the shape's visible graphic).

3. Add a new layer to the graphic, and place it below the second layer. (It becomes the second layer, and the second layer becomes the third layer.)

4 Select the original second layer (which is now the third layer).

5 Press Command-E to merge the selected layer with the new empty layer.

The two layers merge into a new second layer, and the original second layer is deleted. When this shape is imported into DVD Studio Pro, this new second layer will use the opacity you set before the merge.

General Shape Information

When creating a shape in Photoshop, set the new image settings to the following:

- *Width and Height:* Set to values that will hold the shape at the largest size it will ever be used at in DVD Studio Pro (quality tends to suffer much more when you make a shape larger than the original than it does when making the shape smaller). Be sure the shape's graphics come as close to the edges of the canvas as possible—the canvas defines the button's active area. A typical button size is 200 pixels wide by 150 pixels high.
- *Resolution:* Set to 72 pixels per inch. DVD Studio Pro bases the image size on the number of pixels there are—the resolution does not affect its size when used on a menu.
- *Mode:* Set to RGB Color.
- *Contents:* Set to Transparent.

Keep these additional points in mind when creating your shapes:

- It does not matter which layers are visible when you save the shape's file.
- You do not have to rasterize layers with text. You do have to flatten them if you apply an effect to them.
- Be sure that the colors you use are within broadcast limits. You can create shapes that look great in the graphics program but look a lot different once you use them in a DVD project.
- You may want to design shapes with the specific intention of using them for drop zones. This allows you to have drop zones with irregular edges. You need to use the layers exactly as you do when creating a button's shape, except that the highlight layer is not used with drop zones. Shapes created for buttons can also be used for drop zones. See Adding Drop Zones to Your Menu for more information.

Shape Aspect Ratios

Shape graphics are automatically scaled to maintain their aspect ratio. If you create a square graphic and import it as a shape, it will be scaled so that it remains a square graphic in DVD Studio Pro (as long as you add it to a menu by dragging it to an empty area).

While the rescaling makes the graphic look correct in the Menu Editor, the shape's dimensions look incorrect as shown in the Button Inspector or Drop Zone Inspector. For example, if you create a square shape that is 200 pixels wide by 200 pixels high, its size will appear as either 200 pixels wide by 180 high (if applied to an NTSC menu) or 187 pixels wide by 200 pixels high (if applied to a PAL menu), when added to a menu as a button or drop zone.

Creating Graphics for Drop Zones and Buttons

Assets used in drop zones and buttons do not need to conform to video aspect ratios because drop zones and buttons can be resized independently in the horizontal and vertical directions. Additionally, drop zones and buttons support a graphic's transparency. This means you can create a graphic with irregular edges, such as a logo, and when it is assigned as the asset for a drop zone or button, the transparency will control how the graphic appears.

Similar to graphics used for shapes, drop zone and button graphics are automatically scaled to maintain their aspect ratio. If you create a square graphic and import it as an asset for a drop zone or button, it is scaled so that it remains a square graphic in DVD Studio Pro. See Shape Aspect Ratios for more information.

Note: To force the drop zone or button active area to match the graphic's aspect ratio, press Shift while dragging one of its corners.

Getting Good Results Using Assets That Include an Alpha Channel

A video asset, either still or with motion, that includes an alpha channel can be very effective when assigned as a drop zone's asset. DVD Studio Pro composites the asset over the menu background using the alpha channel to control the compositing.

For best results, be sure the video is *premultiplied* (also known as *shaped*). Premultiplied video will have correct soft and anti-aliased edges when used in the Menu Editor. A video channel that is *straight* (also known as *unshaped*) will have incorrect edges when composited in the Menu Editor.

If the application you are using to create your assets provides a choice, it is best to choose premultiplied video.

Preparing Slideshow Assets

7

Before you can add a slideshow to a DVD project, you must have correctly prepared slideshow source material.

This chapter covers the following:

- Slideshow File Formats (p. 113)
- Aspect Ratio and Resolution (p. 114)
- Colors (p. 114)
- Audio (p. 114)

Slideshow File Formats

When preparing still images for use in DVD Studio Pro slideshows, most of the same rules for preparing menu backgrounds apply. These same considerations apply if you intend to add slides to a track.

DVD Studio Pro lets you use most common image formats in slideshows:

- Photoshop PSD files using the 8-bit RGB mode

  Slideshows do not support layer selection, as menus do. The layers visible when the file was last saved become the visible image of the graphic.
- PICT files
- BMP files
- JPEG files
- QuickTime image files
- Targa (TGA) format files
- TIFF (TIF) format files

Once a still is imported into DVD Studio Pro and you build the project it is assigned to, it is converted into an MPEG image and, if necessary, automatically scaled to fit the frame size defined by the slideshow's resolution and display mode settings.

Aspect Ratio and Resolution

You can create 4:3 and 16:9 slideshows. In HD projects, you can also choose a resolution for the slideshow.

Note: In HD projects, the 720 x 480p, 720 x 576p, 1280 x 720p, and 1920 x 1080i resolutions do not support the 4:3 aspect ratio.

When creating 16:9 slideshows, you are able to choose the display mode (pan and scan, letterbox, or pan and scan and letterbox) used when viewed on a 4:3 monitor.

For the best results, you should make sure your slides match the resolution of your slideshow. Slides that are smaller or larger than the slideshow's resolution are automatically scaled to fit it. Slides whose aspect ratio does not match the slideshow's aspect ratio have a background color added to fill in the gaps. The background color is part of DVD Studio Pro Preferences. See Setting DVD Studio Pro Preferences for more information.

Colors

The DVD specification requires all video, including stills and menu graphics, to conform to the NTSC or PAL video broadcast standard for allowable colors. In order to support broadcast bandwidths, NTSC and PAL video must use colors that are substantially restricted compared to those your graphics program can create. It's important to work within the broadcast standard, because pictures and graphics that look fantastic when viewed in a graphics application can look very different when viewed on a DVD. Highly saturated colors create the biggest problems and produce the biggest disappointments when viewed on a video monitor.

Before importing your pictures and graphics, be sure to open them in a graphics application and use a filter to constrict the colors to NTSC or PAL color space.

Audio

Slideshows can have either an individual audio clip assigned to one or more of the stills or one or more audio clips for the overall slideshow.

Important: If you assign an audio clip to the individual stills or use multiple audio clips as the overall slideshow audio, all audio clips in the slideshow must be in the same format (AC-3, AIFF, and so on), have the same bit rate, and have identical resolution.

Preparing Alpha Transitions

8

Alpha Transitions make it possible for you to create customized transitions for use in your DVD Studio Pro menus, tracks, and slideshows.

This chapter covers the following:

- Introduction to Preparing Alpha Transitions (p. 115)
- Transition Asset Folder (p. 116)
- Asset Movie (p. 117)
- Asset Matte Movie (p. 118)
- Background Matte Movie (p. 119)
- About Alpha Transition Durations (p. 119)
- About NTSC and PAL Alpha Transitions (p. 120)

Introduction to Preparing Alpha Transitions

All DVD Studio Pro transitions have a start and end frame, based on where the transition is being used. The standard transitions are able to transform the start and end frame video, providing the ability to have a variety of effects, such as rotating or blurring, directly applied to the video. An Alpha Transition does not directly transform the start and end frame video—it simply transitions from the start to the end based on QuickTime movies you create.

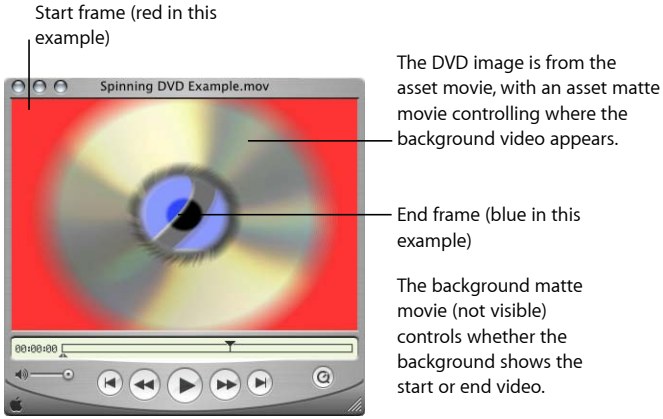
Creating an Alpha Transition requires from one to three QuickTime movies, depending on the type of transition you want to create. Some features to consider include:

- Do you want any kind of video other than the start and end frames to appear during the transition? For example, if you want a spinning DVD to fly across the screen during the transition, you must have an asset movie that provides the flying DVD image.
- Do you want to see the start and end frames on the screen at the same time during the transition? In the example with the spinning DVD, maybe you want to see the start frame around the outside edge of the DVD and the end frame in the DVD's center. To see the start and end frames at the same time, you must have a background matte movie.

- Do you want a simple wipe transition that uses a custom shape? You can use a background matte movie to create a wipe transition with hard or soft edges in any shape you like.

An Alpha Transition has several components:

- *The transition asset folder:* Contains the transition's assets. Additionally, the name of this folder is the name of the transition. Each Alpha Transition requires a separate transition asset folder.
- *The asset movie:* Required if you want any kind of video other than the start and end frames to appear during the transition.
- *The asset matte movie:* Required if your asset movie does not include an alpha channel.
- *The background matte movie:* Required if you want to see the start and end frame video at the same time or if you want to create a wipe transition.



Important: For best results, be sure to use progressive (non-interlaced) video in your movies at either 60 fps for NTSC or 50 fps for PAL. Also, make sure to create movies that match the aspect ratio (4:3 or 16:9) and, in the case of HD projects, the resolution of the elements you will use the transitions with. DVD Studio Pro will scale the movies to match the element if necessary; however, there will be a loss in quality.

Transition Asset Folder

The transition asset folder contains the movies that make up the Alpha Transition. The name of this folder becomes the name of the transition. The names of the files within the folder must include the folder name, with additional text to distinguish the file's purpose.

When you open DVD Studio Pro, it looks in two locations for transition asset folders:

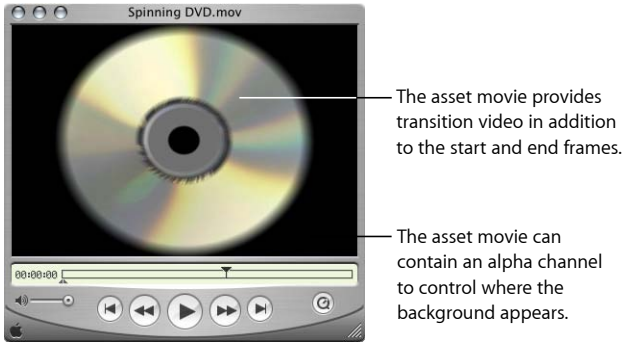
- At the root of your disk, in this location: [root]/Library/Application Support/Final Cut Studio/DVD Studio Pro/Transitions/
- In your home folder, in this location: [user]/Library/Application Support/Final Cut Studio/DVD Studio Pro/Transitions/

Note: If you add a transition folder while DVD Studio Pro is open, it is ignored until the next time you open DVD Studio Pro.

Asset Movie

The asset movie is required if you want any kind of video other than the start and end frames to appear during the transition. For example, if you want a spinning DVD to fly across the screen during the transition, it is the asset movie that provides the flying DVD image.

The asset movie must have the same name as the transition asset folder and can have an extension. For example, if the transition asset folder's name is Spinning DVD, the asset movie could be named Spinning DVD.mov.



There are two optional aspects to the asset movie: an alpha channel and a switch point.

Alpha Channels

In the example with the spinning DVD flying by discussed in the previous section, Asset Movie, you would most likely want to be able to see the start or end frame video through the DVD's hole and around its edges. For this to happen, there must be an alpha channel for DVD Studio Pro to know which parts of the asset movie video should appear and which should be ignored.

There are two ways to provide this alpha channel: embedded with the asset movie or as a separate asset matte movie (described in Asset Matte Movie).

Important: When the alpha channel is embedded with the asset movie, be sure the video output is premultiplied.

Switch Points

If your transition does not require the start and end frame video to be on the screen at the same time, you can add a switch point marker to the asset movie to control when the transition switches from showing the start frame to showing the end frame. If you do want to have both the start and end frame video on the screen at the same time, you must use a background matte movie (described in Background Matte Movie).

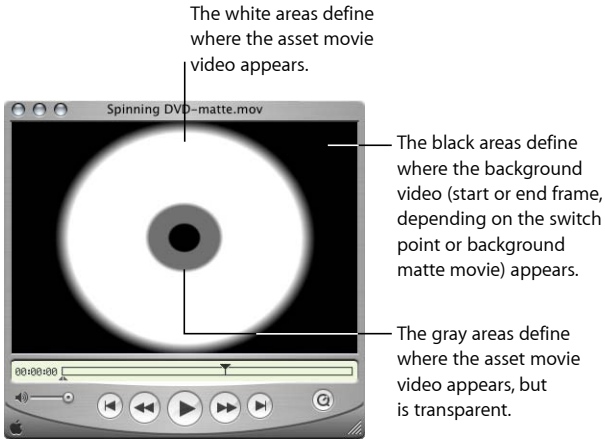
If the transition asset folder does not contain a background matte movie, DVD Studio Pro does the following to set the switch point:

- DVD Studio Pro first looks in the asset movie to see if it includes a marker named TransitionSwitchPoint. If present, this marker is used as the switch point.
- If not present, DVD Studio Pro looks to see if there are any markers in the asset movie. If present, the first marker is used as the switch point.
- If no markers are present in the asset movie, the switch point is set to the asset movie's halfway point.

Asset Matte Movie

The asset matte movie is required only when an asset movie that does not include an alpha channel is used by the transition. Having a separate asset matte movie is particularly useful when the asset movie is normal video (as opposed to an animation).

The asset matte movie must have the same name as the transition asset folder, followed by "-matte" and can have an extension. For example, if the transition asset folder's name is Spinning DVD, the asset matte movie could be named Spinning DVD-matte.mov.



The asset matte movie needs to be monochrome, with white identifying the asset movie video to use, and black identifying the places where the start or end frame video appears. You can also use levels in between white and black to set a transparency and add soft edges.

Background Matte Movie

The background matte movie can be used in one of two different ways:

- It can be used in conjunction with the asset movie to control which areas of the screen should show the start frame video and which should show the end frame video.
- It can be used as the only movie in the transition assets folder to provide a wipe transition. As when used with the asset movie, the background matte movie controls which areas of the screen should show the start frame video and which should show the end frame video.

The background matte movie must have the same name as the transition asset folder, followed by "-backgroundMatte" and can have an extension. For example, if the transition asset folder's name is Spinning DVD, the background matte movie could be named Spinning DVD-backgroundMatte.mov.

The white areas define where the start frame background video appears.

The black areas define where the end frame background video appears.

The background matte movie needs to be monochrome, with white identifying where the start frame video appears, and black identifying where the end frame video appears. As a general rule, the background matte movie should start with a full white screen and end with a full black screen. You can also use levels in between white and black to set a transparency and add soft edges.

About Alpha Transition Durations

The asset movie (if present) or the background matte movie (if the asset movie is not present) determine the default duration of the Alpha Transition. When configuring the transition in DVD Studio Pro, you are able to set the duration from one half the default (but not less than one second) to twice the default duration.

About NTSC and PAL Alpha Transitions

Each Alpha Transition is either NTSC or PAL. DVD Studio Pro uses the frame rate of the transition assets to determine whether they are NTSC or PAL. Only those appropriate to the current project's video standard are available in DVD Studio Pro.

Note: Alpha Transitions using a frame rate of 24 fps can be used only in NTSC projects, though they may show undesirable artifacts when the frame rate is scaled to match the project.

Starting a Project

9

When you start a new DVD project, especially if it's the first project you've created on a particular system, you need to set certain preferences and disc properties before you begin working with your assets.

DVD Studio Pro includes a number of views and windows that you use while building your DVD. See The DVD Studio Pro Interface for a complete description.

This chapter covers the following:

- Opening DVD Studio Pro (p. 121)
- Setting DVD Studio Pro Preferences (p. 124)
- Creating a New Project (p. 138)
- Opening an Existing Project (p. 143)
- Video Standards of the World (p. 145)
- Changing a Project's Video Standard (p. 145)
- Changing a Project's DVD Standard (p. 146)

Opening DVD Studio Pro

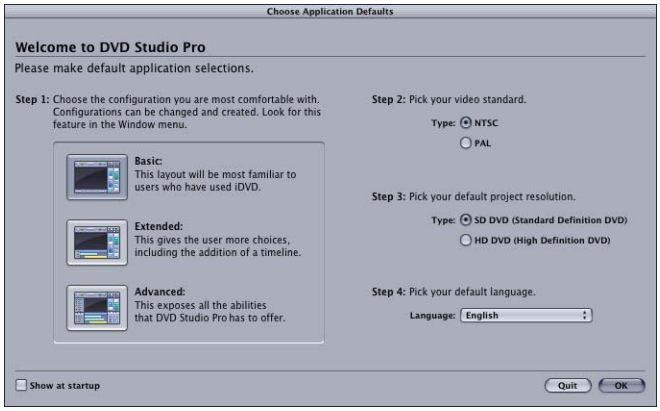
The first time you open DVD Studio Pro, a dialog appears where you choose the user interface configuration, the video standard, the DVD standard, and the default language to use. When opened after this, DVD Studio Pro uses the configuration, video standard, and DVD standard in use when it was last closed.

Note: The choices you make in this dialog are not permanent; all of these can be changed in either DVD Studio Pro Preferences or, in the case of the configurations, in the Window menu.

To open DVD Studio Pro the first time

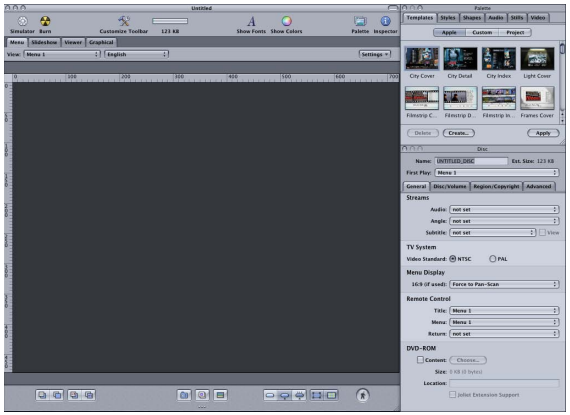
1. Start up your computer.
2. Double-click the DVD Studio Pro icon (in the Applications folder) to open the application.

The Choose Application Defaults dialog appears.

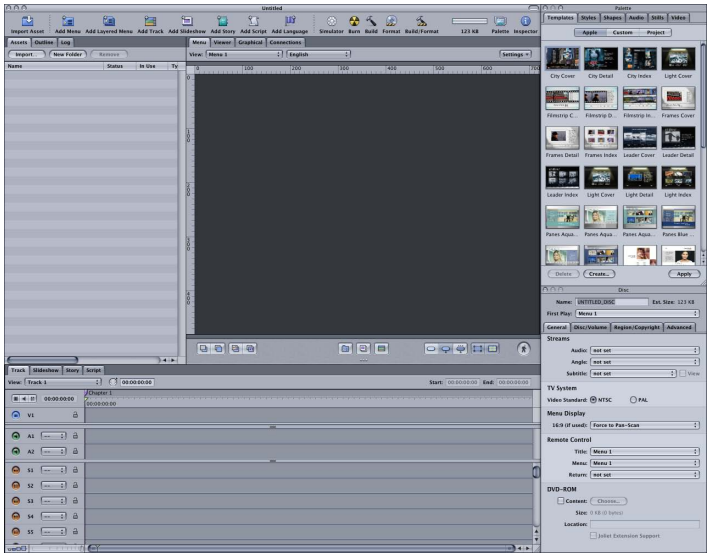


3 Select the configuration that best fits your needs.

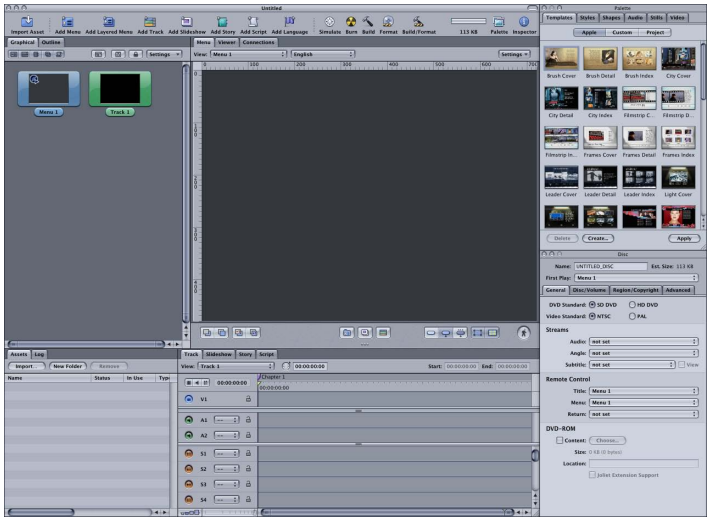
- *Basic:* Use this configuration if you intend to use the templates and styles provided by DVD Studio Pro, and intend to rely on dragging and dropping assets to create your projects. This configuration is intended for users familiar with iDVD and users new to creating DVDs.



- *Extended:* Use this configuration if you are familiar with the DVD creation process and require easy access to more of the features of DVD Studio Pro. The extended configuration displays three quadrants to provide access to additional tabs, and the Inspector.



- *Advanced:* Use this configuration to gain access to all of the capabilities of DVD Studio Pro. Use this configuration if you are authoring complex titles.



Note: Once DVD Studio Pro opens, you can choose from these three configurations and others suitable for specific monitors. In addition, you can create and save your own configurations. See Configuring the Interface for more information on selecting, creating, and saving configurations.

4 Select the video standard, NTSC or PAL, that you will use for your projects. If you are unsure of which standard to use, see Video Standards of the World.

5 Select the default project resolution, SD DVD (Standard Definition DVD) or HD DVD (High Definition DVD), that you will use for your projects.

6 Select the default language for your projects.

7 Select the "Show at startup" checkbox to have this dialog appear each time you open DVD Studio Pro.

8 Click OK to confirm your choices and continue opening DVD Studio Pro.

An untitled project opens, using the selected configuration and defaults.

See The DVD Studio Pro Interface for information on working with the quadrants, tearing off tabs into their own windows, and configuring the toolbar.

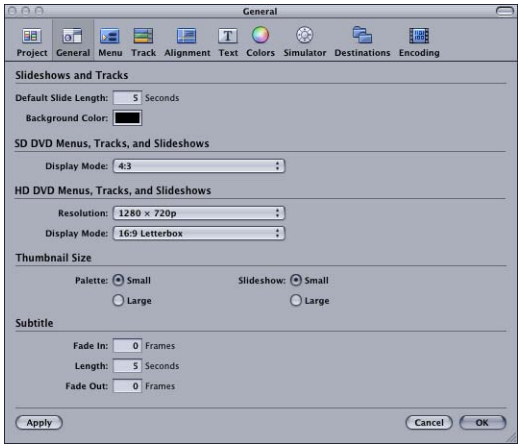
Setting DVD Studio Pro Preferences

The DVD Studio Pro Preferences window contains settings that you can use to configure its default operations. These settings affect all projects you create, although most of them can be overridden for individual projects within the DVD Studio Pro editors and Inspectors. Taking some time now to select these settings can make creating your projects faster and easier.

To open DVD Studio Pro Preferences

- Choose DVD Studio Pro > Preferences, or press Command-Comma (,).

The Preferences window opens, displaying the last selected pane. The Preferences window includes ten panes, each containing settings related to specific areas of DVD Studio Pro.



To use the Preferences window

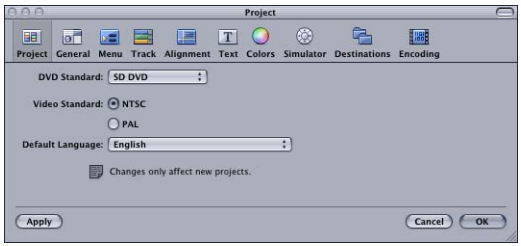
Do one of the following:

- Click an icon along the top to open its pane.
- Click Apply to apply the current settings and leave the Preferences window open.
- Click OK to apply the current settings and close the Preferences window.
- Click Cancel to close the Preferences window without applying the current settings.

Project Preferences

The Project pane in DVD Studio Pro Preferences contains settings used to define basic aspects of new projects.

Note: These settings do not affect the currently open project.

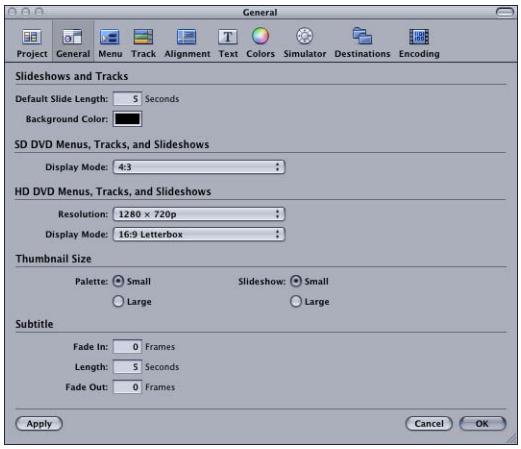


- *DVD Standard:* Choose to define whether new projects are SD DVD (Standard Definition DVD) or HD DVD (High Definition DVD).
- *Video Standard:* Select the video standard to use.
  - *NTSC:* Select this to set new projects to use the NTSC video standard.

- *PAL:* Select this to set new projects to use the PAL video standard.
- *Default Language:* Choose to set the default menu language for new projects.

General Preferences

The General pane in DVD Studio Pro Preferences contains settings used in a variety of areas in DVD Studio Pro.



Slideshows and Tracks

- *Default Slide Length:* Enter a value, in seconds, that is used as the duration of still images added to slideshows and to a track's video stream.
- *Background Color:* You can set the color used as a background by the Slideshow Editor. Normally, this color is not seen because it is covered by the slide. It is seen if the still image is not the correct size to fit in the video frame. In that case, this background color fills the gaps that exist. This color is also used by the Track Editor if you add still images that are not the correct size to fit in the video frame.

  Important: This setting is not saved as part of the project. If you change this setting, it will affect all projects, including previously saved ones, that have this color visible.

SD DVD Menus, Tracks, and Slideshows

- *Display Mode:* Choose the default aspect ratio to use when creating menus, tracks, and slideshows in SD projects. You can choose from 4:3, 16:9 Pan-Scan, 16:9 Letterbox, and 16:9 Pan-Scan & Letterbox.

HD DVD Menus, Tracks, and Slideshows

- *Resolution:* Choose the default video resolution to use when creating menus, tracks, and slideshows in HD projects. You can choose from 720 x 480i, 720 x 480p, 1280 x 720p, 1440 x 1080i, and 1920 x 1080i.

- *Display Mode:* Choose the default aspect ratio to use when creating menus, tracks, and slideshows in HD projects. You can choose from 4:3, 16:9 Pan-Scan, 16:9 Letterbox, and 16:9 Pan-Scan & Letterbox.

  Note: The 4:3 setting is not available if you choose a Resolution setting that does not support it (720 x 480p, 720 x 576p, 1280 x 720p, and 1920 x 1080i).

Thumbnail Size

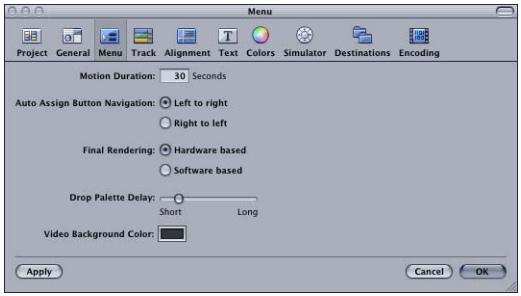
- *Palette:* Select a thumbnail size.
  - *Small:* Select this to use small thumbnails in the Palette.
  - *Large:* Select this to use large thumbnails in the Palette.
- *Slideshow:* Select a thumbnail size to use in slideshows.
  - *Small:* Select this to use small thumbnails in the Slideshow Editor.
  - *Large:* Select this to use large thumbnails in the Slideshow Editor.

Subtitle

- *Fade In:* Enter a value, in frames, that controls whether a subtitle, by default, appears instantly (0 frames) or fades on over a number of frames.
- *Length:* Enter a value, in seconds, that controls the default length of new subtitles you create.
- *Fade Out:* Enter a value, in frames, that controls whether a subtitle, by default, disappears instantly (0 frames) or fades off over a number of frames.

Menu Preferences

The Menu preferences allow you to set a variety of defaults used when creating menus.



- *Motion Duration:* Enter a default duration, in seconds, to use when you create a motion menu. See Configuring Motion Menu Settings for more information.
- *Auto Assign Button Navigation:* See Right-to-Left Reading Mode for more information.
  - *Left to right:* Set the Auto Assign feature to wrap button navigation for left-to-right reading.

- *Right to left:* Set the Auto Assign feature to wrap button navigation for right-to-left reading.

- *Final Rendering:* Because menus can contain a variety of elements layered over the background, such as buttons, drop zones, and text, they must be rendered into a single layer, similar to flattening a multiple layer graphic file. With still menus, this takes little time, but with motion menus, where each frame must be rendered, this can be a time-consuming process. Additionally, all transitions you add to your project must be rendered. See About Menu Rendering for more information.

  The Final Rendering settings allow you to select how the menus and transitions are rendered:

  - *Hardware based:* This setting provides the fastest rendering. However, because the quality is dependent on your system's video card, the quality might not be as good as when using the "Software based" setting and may not be consistent between different systems.
  - *Software based:* This setting provides consistent, good-quality rendering on all systems. However, depending on your system, it may take substantially longer than the "Hardware based" setting.

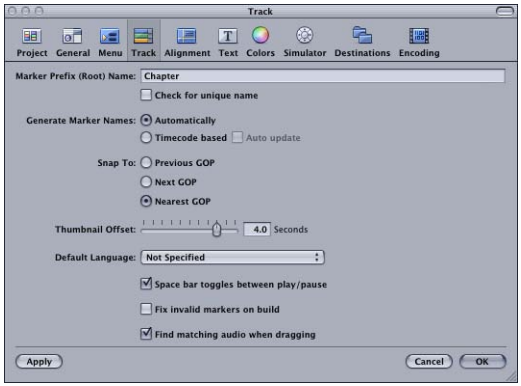
- *Drop Palette Delay:* Position the slider to control how long of a delay there is before the Drop Palette appears over the Menu Editor when you drag an asset to it.

- *Video Background Color:* You can set the color used as a background by the Menu Editor when no asset has been assigned as the menu's background. Normally, this color is not seen because it is covered by the menu background. It is seen if the background image is not the correct size to fit in the video frame. In that case, this background color fills the gaps that exist.

  Important: This setting is not saved as part of the project. If you change this setting, it will affect all projects, including previously saved ones, that have this color visible.

Track Preferences

The Track preferences allow you to set a variety of defaults used when creating tracks.



- *Marker Prefix (Root) Name:* Enter the name that all new markers use as their prefix. The Generate Marker Names setting, below, controls whether this root name is followed by a number of timecode value.
- *Check for unique name:* Select this checkbox to ensure you will not have two markers with the same name within a track.
- *Generate Marker Names:* You can select how markers are named when you create them.

  Note: You can rename the markers in the Marker Inspector.

  - *Automatically:* This setting names new markers with the prefix followed by a number that increments each time you add a marker. (You set the prefix below.) An advantage of this option is that you can easily tell how many markers have been added (although the number does not take into account any markers that you may have deleted). A disadvantage is that, because you can add markers between existing ones, the numerical order of the markers is not necessarily the same as their order in the timeline—the numerical order is based on the order the markers are created, not on their position.
  - *Timecode based:* This setting names new markers with the prefix followed by the timecode of the video asset. (You set the prefix below.) An advantage of this option is that the marker names are always in the order they appear in the timeline. A disadvantage is that you cannot easily tell how many markers you have in the track. When you select "Timecode based," the "Auto update" checkbox becomes available. Selecting this checkbox causes the timecode value assigned to a marker's name to update if you move the marker.

- *Snap To:* This setting controls what happens when you place a marker in the timeline. In DVD Studio Pro, markers can only be placed on I-frames, which occur once per group of pictures (GOP). A GOP is typically 12 to 15 frames long, which means that when you place a marker, you generally will not be able to place it on the exact frame you would like. This setting allows you to control how DVD Studio Pro chooses the frame to use.

  See Working with GOP Settings for more information on GOPs.

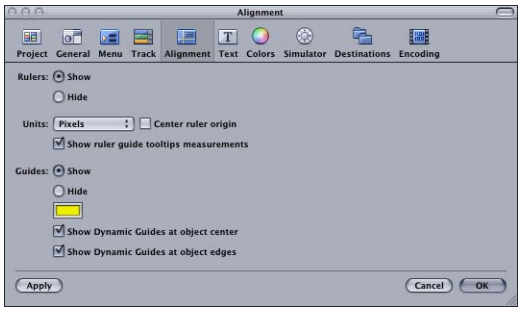
  - *Previous GOP:* This setting places the marker on the GOP occurring before the selected location.
  - *Next GOP:* This setting places the marker on the GOP occurring after the selected location.
  - *Nearest GOP:* This setting places the marker on the GOP closest to the selected location, either before or after it.
- *Thumbnail Offset:* A thumbnail image of the video asset, representing its first frame, appears in the Video tab in the Palette, in the Video Asset Inspector that appears when you select a video asset in the Assets tab, and at the first frame of the video stream in the Track Editor. This setting allows you to determine whether the thumbnail used in those places is based on the video frame at the start of the video asset or on a frame up to five seconds later in the asset. Because video assets often start at black and fade up, this setting allows you to set the thumbnail to a frame that has video that better represents the asset.
- *Default Language:* You can choose a language that is automatically assigned to all audio and subtitle streams in new tracks. Choose Not Specified to have no language assigned to the streams.
- *Space bar toggles between play/pause:* This setting controls what happens when you press the Space bar while viewing a track. When you play a track, the timeline's playhead follows along. With the checkbox next to "Space bar toggles between play/pause" selected, the playhead in the track's timeline remains at its current position when you press the Space bar. When the checkbox is not selected, the playhead jumps back to where you started playing from when you press the Space bar.

  Note: This setting does not affect the pause and stop controls in the Viewer tab—only what happens when you use the Space bar while playing a track.
- *Fix invalid markers on build:* While creating your tracks, it is possible to end up with markers that either are not positioned on GOP boundaries or fall outside of the V1 stream. When this checkbox is not selected, a build operation stops if any invalid markers are detected. With the checkbox selected, a build operation automatically repositions any markers that are not placed on GOP boundaries and removes any markers that are outside the V1 stream.

- *Find matching audio when dragging:* Select this checkbox to have DVD Studio Pro automatically try to locate an audio file with the same name as the video file you have dragged to an element, such as a menu or the Assets tab, of your project. DVD Studio Pro only checks the folder the video file was dragged from. DVD Studio Pro does not try to find matching audio if you drag a mixture of video and audio files. You can press the Command key after you start dragging a video asset to temporarily override this setting.

Alignment Preferences

The Alignment preferences apply to the Menu and Subtitle Editors, allowing you to customize the rulers, guides, and snapping actions.

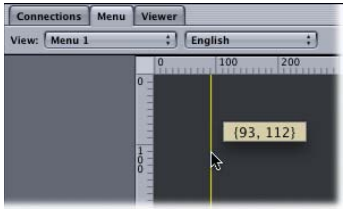


- *Rulers:* These settings allow you to customize the rulers that appear in the Menu Editor.

  Note: Alignment guides can only be dragged onto the Menu Editor if the rulers are visible.

  - *Show:* Select this to show the rulers in the Menu Editor.
  - *Hide:* Select this to hide the rulers in the Menu Editor.
- *Units:* Choose the units for the rulers from the pop-up menu.
  - *Pixels:* The rulers show the number of pixels.
  - *Centimeters:* The rulers show the number of centimeters, based on 28.35 pixels per centimeter.
  - *Inches:* The rulers show the number of inches, based on 72 pixels per inch.
  - *Percentage:* The rulers show the percentage of the frame.
- *Center ruler origin:* Select this checkbox to have the rulers start at the center of the frame. This places "0" at the center of the rulers, with the units counting up from there in both directions. When this checkbox is not selected, the ruler's origin is the frame's upper-left corner.

- *Show ruler guide tooltips measurements:* Select this checkbox to have the pointer's coordinates appear when dragging an alignment guide. The values are in pixels, based on a position of 0, 0 for the upper-left corner.



- *Guides:* These settings apply to the guides that appear in the Menu and Subtitle Editors.

  Note: You cannot add menu guides in the Subtitle Editor.

  - *Show:* Select this to show the guides in the Menu and Subtitle Editors.
  - *Hide:* Select this to hide the guides in the Menu and Subtitle Editors.
- *Guide color:* Set the color for the menu guides and the dynamic guides that appear when you move an item in the Menu or Subtitle Editor. Click to open the Colors window.
- *Show Dynamic Guides at object center:* Select this checkbox to have the dynamic guides that appear when you drag an item in the Menu and Subtitle Editors show lines referenced to the item's center.
- *Show Dynamic Guides at object edges:* Select this checkbox to have the dynamic guides that appear when you drag an item in the Menu and Subtitle Editors show lines referenced to the item's edges.

Text Preferences

The Text preferences contain the default settings that apply when adding text to a menu, a menu's button, and to a subtitle.

All Text Types

The following settings apply to all types of text you can configure.

- *Show:* Choose the type of text to configure (subtitle, menu, or menu button). The type you choose determines the other settings available in this pane.
- *Font:* Shows the current settings.
- *Font Panel:* Click to open the Fonts window to configure the font.

Subtitle Text Settings

The following settings apply to subtitle text.

Note: You cannot set the subtitle text color as you can for the menu button and menu text items.

- *Horizontal:* Select the horizontal justification (left, center, or right) to use for your subtitle text. Use this to set the default positioning of text-based subtitles you create in DVD Studio Pro. See Creating Subtitles with DVD Studio Pro for more information.
- *Horizontal Offset:* Enter values to modify the horizontal justification setting. For example, you can enter a horizontal offset value to move the text slightly toward the center when you have selected left justified as the horizontal setting. Negative values move the text to the left and positive values move it to the right.
- *Vertical:* Select the vertical justification (top, center, or bottom) to use for your subtitle text.
- *Vertical Offset:* Enter values to modify the vertical justification setting. For example, you can enter a vertical offset value to move the text slightly toward the center when you have selected bottom justified as the vertical setting. Negative values move the text up and positive values move it down.

Menu Button Defaults

The following settings apply to menu button text. See Adding Text to a Button for more information.

- *Color Panel:* Click to open the Colors window for configuring the text color.
- *Position:* Select the default position for the button's text (Bottom, Top, Right, Left, or Center).
- *Include text in highlight:* Select this checkbox to have the text included as part of the button's highlight area.

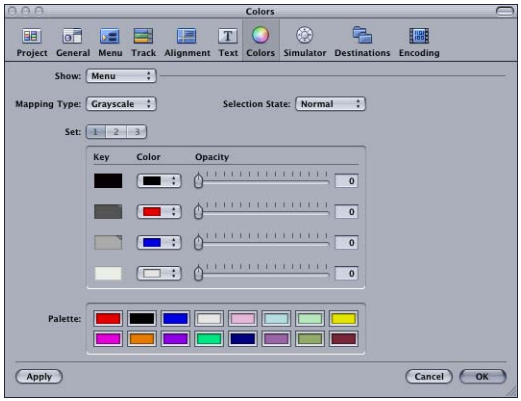
Menu Text Settings

The following setting applies to menu text. See Adding Text Objects to a Menu for more information.

- *Color Panel:* Click to open the Colors window for configuring the text color.

Colors Preferences

The Colors pane contains the color mapping settings for the Menu and Subtitle Editors.

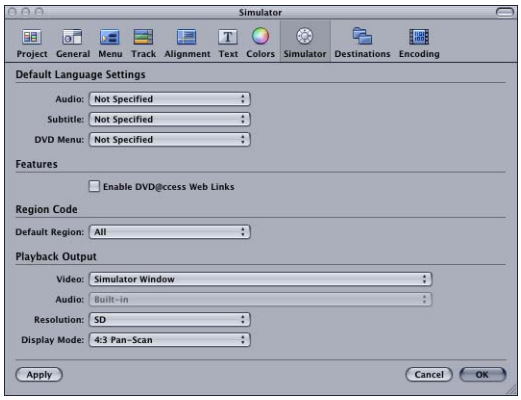


- *Show:* Choose whether to show the settings for the Menu Editor or Subtitle Editor. This affects all other settings in this pane.
- *Mapping Type:* Choose the type of overlay mapping, Chroma or Grayscale, you are using. This only applies if you are using advanced overlays. See Using Advanced Overlay Color Mapping for more information.
- *Selection State:* Choose which of the three selection states (Normal, Selected, or Activated) to configure.
- *Set:* Select which of the three color mapping sets to configure. These settings are only active when the Selection State is set to Selected or Activated. See Color Mapping Sets for more information.
- *Key, Color, and Opacity Settings:* Choose the color and opacity setting for each of the overlay's four colors (shown in the Key column) for each selection state and set. See Colors Tab in the Menu Inspector with Advanced Selected for more information.

  Note: Shapes and simple overlays use the black key color (the top one) for their highlights.
- *Palette:* This shows the colors in the color mapping palette. You can change a color by clicking it and selecting a new color in the Colors window. See Setting the Colors in the Color Palette for more information.

Simulator Preferences

The Simulator preferences apply to the Simulator you can use to test your project. See Simulating Your Project for more information.



Default Language Settings

- *Audio, Subtitle, and DVD Menu Default Language:* Choose the languages to use as the Simulator's default for menus, audio, and subtitles. This simulates the language settings in a DVD player. If you want any of these elements to use the stream settings in the Disc Inspector in place of the language settings, choose Not Specified.

Features

- *Enable DVD@CCESS Web Links:* Select so that the Simulator can process any DVD@CCESS links in the project. This is useful to verify that email and web links work correctly. See Testing DVD@CCESS Links for more information.

Region Code

- *Default Region:* Choose the region code to simulate. You can choose All or a specific region.

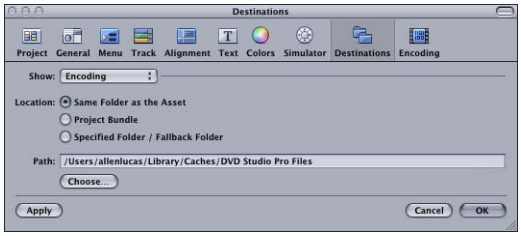
Playback Output

- *Video:* Choose the destination for the Simulator video. The two choices are Simulator Window, which is the default setting, and Digital Cinema Desktop Preview, which actually selects your system's second monitor, whether it is an S-Video monitor, an Apple Cinema Display, or any other appropriate display. See Simulating with an External Video and Audio Monitor for more information.
- *Audio:* Choose the destination for the Simulator, Assets tab, and any of the editors' (Track, Story, Slideshow, and Menu Editor) audio. Common choices include Built-in Audio, for normal system audio, and Built-in Audio (S/PDIF), which uses your system's optical digital audio output (if available) to output the audio to an external AC-3 or DTS decoder.

- *Resolution:* Choose the monitor resolution to simulate. The choices include SD, HD 720, and HD 1080.
- *Display Mode:* Choose the monitoring situation to simulate.
  - *4:3 Pan-Scan:* This setting simulates a 4:3 aspect ratio monitor with a DVD player configured to use the pan-scan method when showing 16:9 content.
  - *4:3 Letterbox:* This setting simulates a 4:3 aspect ratio monitor with a DVD player configured to use the letterbox method when showing 16:9 content.
  - *16:9:* This setting simulates a 16:9 aspect ratio monitor.

Destinations Preferences

The Destinations preferences control the location of files created during a variety of processes within DVD Studio Pro.

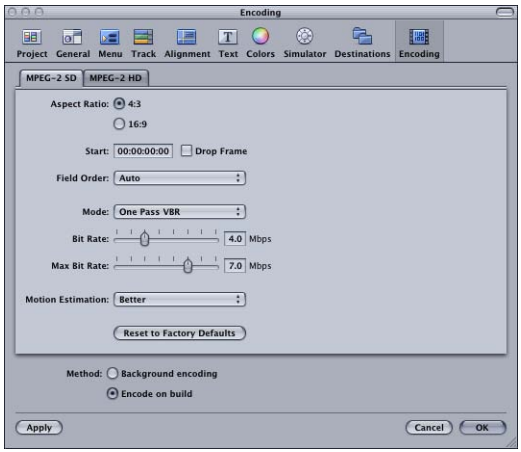


- *Show:* Choose the process whose path you want to configure.
  - *Encoding:* This process specifies the location for the video and audio files that are created by the integrated MPEG and AIFF encoders when you import QuickTime files into your project. See Importing Assets That Are Not DVD-Compliant and Using the Integrated MPEG Encoder for more information.
  - *Image Encoding:* This process specifies the location for the MPEG files that are created when you use non-MPEG still images in your menus, slideshows, and within a track. See Using Still Assets That Are Not DVD-Compliant for more information.
  - *MPEG Parsing:* This process specifies the location for the parse files that are created when you import MPEG files. See About the Parse Files for more information.
  - *Build/Format:* This process contains settings that define the default location to which the AUDIO_TS and VIDEO_TS folders, created during the build process, are saved. See Building Your Project for more information on building your project.
  - *Palette Elements:* This process specifies the location for the stock (Apple supplied) and custom items that appear in the Palette. Each setting has its own Choose and Reset buttons. Click Choose to open a dialog to choose the folder to use. Click Reset to revert to the factory default settings. The default location for the stock items is /Library/Application Support/Final Cut Studio/DVD Studio Pro/.

- *Location:* Select the location to save files to.
  - *Same Folder as the Asset:* This is the default setting. It places the files into an MPEG or PAR subfolder (depending on the type of file being created) in the original file's folder. For QuickTime assets, an MPEG folder is created, with a PAR subfolder. The encoded file is placed in the MPEG folder and, if necessary, the parse file is placed in the PAR folder. For assets that are already MPEG-encoded, a PAR folder is created and the parse file is placed there. If the original files are on a volume that can't be written to, such as a CD-ROM disc or a disk you do not have Write privileges for, DVD Studio Pro automatically writes to the Specified Folder/Fallback Folder location.
  - *Project Bundle:* This setting saves the files to the project file. To see the contents of the project file (the file created when you saved your project), locate the file in the Finder, Control-click it, then choose Show Package Contents from the shortcut menu. If you have not saved your project yet, the files are saved at your Specified Folder/Fallback Folder location.
  - *Specified Folder/Fallback Folder:* This setting saves the files to a disk and folder you choose. You can either enter the path directly or click Choose to open a dialog to choose the folder to use. It is also used when DVD Studio Pro is unable to write to the Same Folder as the Asset or Project Bundle locations. The default path is in your home folder at /Library/Caches/DVD Studio Pro Files. If you specify a location that cannot be written to, this default path is used in its place.

Encoding Preferences

The Encoding pane contains the settings that control the integrated MPEG encoder, which is used when you import a QuickTime asset. See Using the Integrated MPEG Encoder for more information on the integrated MPEG encoder and details on these settings.



Creating a New Project

When you open DVD Studio Pro, a new project file is automatically created. You can also create a new project at any time.

To create a new project

1 Choose File > New (or press Command-N).

A dialog asks whether you want to save the currently open project. Once you select an answer, a new, empty project opens.

2 Choose File > Save, specify a name and location for your project file, then click Save.

Saving your project early ensures that if any files need to be saved to your project during the authoring process, they have a place to be written to.

Once you have created and saved your project, there are four areas you might want to configure before you begin.

- *Setting the video standard:* DVD-Video titles are based on one of two video standards: NTSC or PAL. You cannot create a DVD-Video title that supports both video standards. DVD Studio Pro includes a video standard setting that applies to projects created after the standard has been set. It's a good idea to confirm this setting if this is the first DVD Studio Pro project you are creating or if you author both NTSC and PAL titles on this system. See Setting the Video Standard for more information.
- *Setting the DVD standard:* You can author either SD or HD projects with DVD Studio Pro. If you are authoring an SD project, you can change it to HD. If you are authoring an HD project, you cannot change it to an SD project just by changing the DVD standard. See Changing a Project's DVD Standard for more information.
- *Naming the project:* Each project is given a name that can be seen by the viewer when the finished DVD is played on a computer or on some set-top DVD players. DVD Studio Pro automatically uses the project's filename, created when you saved the project, as the project name. See Naming the Project for information on how to change this.
- *Setting the disc size:* By default, DVD Studio Pro is set to use a 4.7 GB disc. This setting affects not only the disc burning process but also the toolbar's disc meter. See Setting the Disc Size for information on changing this setting if you intend to work with other disc sizes.
- *Setting the First Play element:* Each project must have an element designated as "first play." This is the element that appears when the viewer first starts playing the DVD. By default, it is Menu 1. You can set this to be any element in your project. See Setting the Project's First Play for more information.

Setting the Video Standard

The DVD-Video specification supports two video standards: NTSC and PAL. This may appear to leave out those countries that use the SECAM or PAL-M video standards. However, because the MPEG video on DVDs is in a component format, your sources, once MPEG-encoded, only need to conform to the line and frame rates of either the NTSC or PAL standard.

- *Use the NTSC video standard:* If you are in a country that supports either the NTSC or PAL-M video standard. Both standards use a 29.97 fps frame rate with 525 lines per frame. As a general rule, if your country uses 60 Hz AC power, you should use the NTSC video standard.
- *Use the PAL video standard:* If you are in a country that supports either the PAL or SECAM video standard. Both standards use a 25 fps frame rate with 625 lines per frame. As a general rule, if your country uses 50 Hz AC power, you should use the PAL video standard.

See Video Standards of the World for a list of countries and the video standards they support.

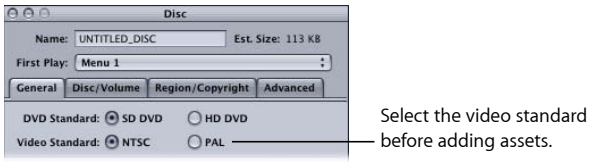
You cannot mix NTSC and PAL assets on a DVD. See NTSC or PAL? for more information. Also see Changing a Project's Video Standard for information on converting a project from one video standard to the other.

Important: If you have any doubts about whether your system is set to the correct standard, you should verify its setting (described next) and change it if necessary before you start adding assets to your project.

To set the video standard for the current project in the Disc Inspector

1. Choose View > Show Inspector if the Inspector is not visible.
2. Do one of the following:
   - Select the project's name (next to the disc icon) in the Outline tab. (Choose Window > Outline if the Outline tab is not visible.)
   - Click an empty area in the Graphical tab.

   The Disc Inspector appears.



3. In the General tab, select either NTSC or PAL to set the project's video standard.

Note: You cannot change a project's video standard once you have added motion assets to it. See Changing a Project's Video Standard for more information.

The other Disc Inspector settings can be made later. See Finishing a Project for details on these settings.

To set the video standard for DVD Studio Pro in the Preferences window

1 Choose DVD Studio Pro > Preferences, or press Command-Comma (,) to open the Preferences window.
2 Click the Project icon at the top of the Preferences window to open the Project pane.
3 Choose either the NTSC or PAL video standard.

This setting only affects projects created after it is set.

Setting the DVD Standard

You can choose from two DVD standards when you start your project: the original SD DVD standard based on standard definition video assets and the new HD DVD standard designed to use high definition video assets.

Most asset formats supported by SD-based DVDs are also supported by HD-based DVDs. The exception is MPEG-1 video, which is not supported in HD projects. See About Standard and High Definition DVDs for more information.

There are two places to set the DVD standard—each is used for different circumstances.

Setting the DVD Standard in DVD Studio Pro Preferences

You can set the DVD standard for all new projects in the Project pane of DVD Studio Pro Preferences. This setting does not affect the current project.

To set the DVD standard for new projects

1 Choose DVD Studio Pro > Preferences, or press Command-Comma (,) to open the Preferences window:
2 Click the Project icon at the top of the Preferences window to open the Project pane.
3 Choose either SD DVD or HD DVD from the DVD Standard pop-up menu.

Setting the DVD Standard in the Disc Inspector

The General tab in the Disc Inspector contains a setting that shows the DVD standard for the currently open project.

- *If SD DVD is selected:* You can change the project to HD DVD.
- *If HD DVD is selected:* The settings are deactivated and you cannot change the project to SD DVD.

Note: If you create a new project and it has HD DVD selected when you actually intend to create an SD project, you must change the DVD Standard setting in the Project pane of DVD Studio Pro Preferences.

To change the DVD standard for the current project using the Disc Inspector

1 Choose View > Show Inspector if the Inspector is not visible.

2 Do one of the following:

- Select the project's name (next to the disc icon) in the Outline tab.
- Click an empty area in the Graphical tab.

The Disc Inspector appears.

3 Select the General tab (if it's not already selected).

4 Note the DVD Standard setting.

- *If SD DVD is selected:* You can change the project to HD DVD. A warning appears saying that you will not be able to change the project back to the SD DVD standard.
- *If HD DVD is selected:* The settings are deactivated and you cannot change the project to SD DVD.

See Changing a Project's DVD Standard for more information.

Naming the Project

By default, each DVD disc you create is automatically given the same name as the project's file, entered when you saved it. The disc's name can be seen by the viewer when the finished DVD is played on a computer or on some set-top DVD players.

In most cases, the name of the project's file is suitable to use as the disc's name. However, there are some cases in which you might want to set the disc's name independently of the project's filename. For example, you may have several versions of a project, such as Bicycles 1, Bicycles 2, and Bicycles 3, that you will choose from for the final project. In this case, if you choose the Bicycles 2 version of the project, you would not want the final disc to appear as Bicycles 2 when the viewer plays the title—you would want it to say simply Bicycles.

The name of the disc is restricted to uppercase letters, numbers, and the underscore character. There is a maximum of 32 characters. The project's filename is automatically converted to work with these restrictions when it is used as the disc's name. For example, a project filename of Bicycle 2 is converted to a disc name of BICYCLE2.

To name the disc in the Disc Inspector

1 Do one of the following:

- Select the disc's name (next to the disc icon) in the Outline tab.
- Click an empty area in the Graphical tab.

The Disc Inspector appears.

Note: Choose View > Show Inspector if the Inspector is not visible.

2 Enter the new name for the disc in the Name field at the top of the Disc Inspector, then press Return.

Setting the Disc Size

The DVD Studio Pro default is set to a 4.7 GB DVD-5. This setting affects both the actual disc burning process when you finish your project and the disc meter icon in the toolbar.

In addition to showing the estimated project size numerically, the disc meter also shows how full the disc is getting graphically. The disc meter uses the project's disc size setting to determine the disc's capacity.

As long as you intend to burn DVD-5 discs, the disc meter is accurate. If you intend to burn a blue laser, dual-layer, or 8 cm disc, you need to set the disc size to the proper format so that the disc meter reflects the changed requirements of your project.

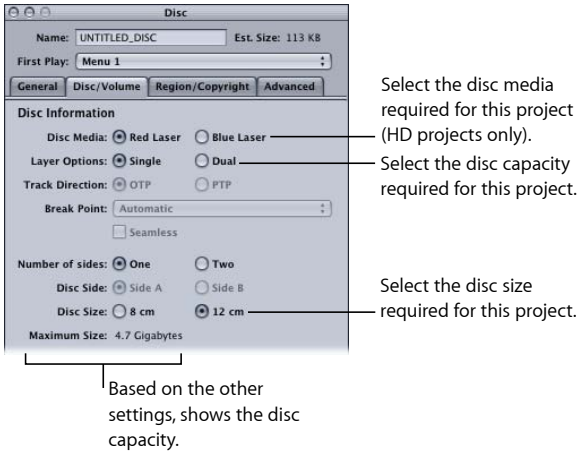
To set a project's disc size

1 Do one of the following:

- Select the project's name (next to the disc icon) in the Outline tab.
- Click an empty area in the Graphical tab.

The Disc Inspector appears. (Choose Window > Outline if the Outline tab is not visible. Choose View > Show Inspector if the Inspector is not visible.)

2 Click the Disc/Volume tab in the Disc Inspector.



3 Select Red Laser or Blue Laser as the Disc Media (HD projects only).

4 Select Single or Dual as the Layer Options.

5 Select 8 cm or the standard 12 cm as the Disc Size.

The maximum size for the project appears below the Disc Size setting.

The other Disc Inspector settings can be made later. See Finishing a Project for details on these settings. See Disc Options for more information on available DVD sizes. See topics relating to finishing a project for more information on these settings.

Setting the Project's First Play

An important consideration when starting a project is deciding which of its elements will be the first to appear when a viewer starts playing the DVD. Some examples might be:

- Using the default setting and opening Menu 1 when the DVD starts playing
- Setting First Play to a motion menu or track that plays before the main menu appears. This motion menu or track could be a short animated company logo or a disclaimer.
- Creating a DVD for continuous kiosk playback. You may want to have a disc that plays a track over and over, with no menus or other viewer interaction. In that case, you would set the track to be the First Play element and set the track's End Jump setting to be that same track.
- Running a script to determine if the DVD should be allowed to play on this player. A script could also be used to configure playback to match the DVD player's languages or its display's aspect ratio. The script would end by choosing the first element to play for the viewer. (The viewer would not actually know that a script is the First Play element.)

To set the project's First Play to an element other than Menu 1, you must first create that element. For this reason, you do not have to (and often can't) set the project's First Play when you start creating your project, but it is a good idea to have a plan in mind.

You can set the project's First Play in the Disc Inspector, the Connections tab, the Outline tab, and the Graphical tab. See Assigning the First Play Element for information on using the Outline and Graphical tabs to set the First Play. See Settings at the Top of the Disc Inspector for information on using the Disc Inspector to set the First Play. See Source Details for information on using the Connections tab to set the First Play.

Opening an Existing Project

There are several methods you can use to open an existing DVD Studio Pro 4 project. These methods can also be used to open projects created with earlier versions of DVD Studio Pro. See Importing Other Projects for more information on opening earlier DVD Studio Pro projects.

To open an existing project

Do one of the following:

- Choose File > Open (or press Command-O).

- Press Command-O.
- Double-click the project file in a Finder window.

If a project is already open in DVD Studio Pro, a dialog appears, prompting you to save it if it has not already been saved.

Note: DVD Studio Pro only allows you to have one project open at a time.

To open a recently opened project

- Choose File > Open Recent > [name of project].

You can choose File > Open Recent > Clear Menu to remove existing projects from the Open Recent submenu.

There are several issues to be aware of when opening an existing project:

- If you open a DVD Studio Pro project that uses a font that is not on the computer you are opening it on (either because the font was deleted or the project was created on a different computer), any items using the missing font have a different font substituted with no warning.

  There are three items in a DVD Studio Pro project that utilize fonts: a menu's text objects, a button's text, and text-based subtitles.

- When you open a project that uses assets requiring parse files, DVD Studio Pro checks to see if the files are available. If not, it creates them as part of the project-opening process; in these cases, the project takes longer to open. It is not uncommon for the parse files to be left behind when moving a project and its assets from one computer to another. Creating the parse files can take from a few seconds to several minutes, depending on the number and length of the assets used in the project. A progress bar indicates the completion status of the parse file. See About the Parse Files for more information about parse files.

- When you open a project that DVD Studio Pro is unable to locate assets for, a Missing Files window appears. You can use the window to manually locate the assets. If you choose to open the project with missing assets, those assets are displayed in red in the Assets tab, and any elements that use them are disabled. See Missing or Renamed Assets for more information.

- Multiple users can open the same project over a network. This can lead to problems if each user makes changes and resaves the project. When another user opens the same project you are currently working with, an alert appears that names the other user and computer that opened the project.

  Important: DVD Studio Pro does not prevent multiple users from writing to a project. You must use care to avoid this situation and immediately resolve any alerts that appear.

Video Standards of the World

Because you may find yourself needing to know the video standard of a particular country, following is a list of the different continents and regions of the world and the video standards they use.

Note: This list is subject to change and should be used as a guideline only.

Continents and regions	Video standard
Africa	All countries in the African continent use either the PAL or SECAM video standard.
Asia	All countries in the Asian continent use either the PAL or SECAM video standard, with the exception of Burma, Japan, the Philippines, South Korea, Taiwan, and Vietnam, which use the NTSC video standard.
Caribbean	All islands in the Caribbean region use the NTSC video standard, with the exception of Guadeloupe and Martinique, which use the SECAM video standard.
Central America	All countries in Central America use the NTSC video standard.
Europe	All countries in the European continent use either the PAL or SECAM video standard.
Middle East	All countries in the Middle East use either the PAL or SECAM video standard.
North America	All countries in North America use the NTSC video standard, with the exception of Greenland, which uses the PAL video standard.
Oceania	All countries in the Oceania region, including Australia and New Zealand, use either the PAL or SECAM video standard, with the exception of American Samoa, Guam, the Marshall Islands, Micronesia, the Midway Islands, Palau, and Samoa, which use the NTSC video standard.
South America	All countries in South America use the NTSC video standard, with the exception of Brazil, which uses the PAL-M video standard, and Argentina, Paraguay, Uruguay, and French Guyana, which use either the PAL or SECAM video standard.

Changing a Project's Video Standard

When you create a project, all assets used in it must be the same video standard (NTSC or PAL). If you want the project to be available in both video standards, you need to create two projects—one for each standard. You can minimize the amount of work involved in re-creating the project in the other video standard by keeping the following rules in mind:

- You cannot have any video assets assigned to the project when you try to change the project's video standard. Before you can remove the assets from the project, they must not be in use by any of the project's elements.

- Any markers placed in the Track Editor remain behind when you remove the video asset. If you then change the project's video standard and import a version of the video asset in the new video standard, the markers are applied to the new asset. The timecode values of the markers change to match the new video standard. Depending on the encoding used, the markers may no longer occur at GOP boundaries. Be sure to select the "Fix invalid markers on build" setting in the Track pane of DVD Studio Pro Preferences to ensure you will be able to build the project. See Track Preferences for more information.
- Still assets do not need to be removed before you change a project's video standard. DVD Studio Pro automatically rescales still assets (except overlays) to the new video standard; however, for the best quality, it is recommended that you remove the original assets and import versions that match the new video standard.
- All menu settings, including button connections, drop zones, and text objects, are retained when you change a project's video standard. This reduces the amount of reconfiguration you have to go through when changing video standards, even if you have to change the menu's background.

  Note: An exception is if any buttons or drop zones use motion assets—the assets must be removed from these elements before you change the video standard.
- Audio assets can be used with either video standard.
- If you add a QuickTime asset whose video standard is different from the project's current setting, the integrated MPEG encoder automatically transcodes the asset to the project's video standard while encoding it. For example, if you are working on a PAL project and accidentally import an NTSC QuickTime file, the NTSC file is encoded as a PAL asset and is imported into the project.
- Templates and styles are specific to the video standard. If your project relies on custom templates and styles, you will need to create versions in both NTSC and PAL to be able to use them in both standards.

  Note: Apple templates and styles are supplied in both the NTSC and PAL standards. Shapes are not specific to the video standard.

Changing a Project's DVD Standard

DVD Studio Pro makes it easy to convert an SD project to an HD project. However, there is no comparable method to use to convert an HD project to an SD project. For that reason, *if you are intending to build both an SD and HD version of the project, you should start by building the SD version first*.

Note: If you create a new project and it has HD DVD selected when you actually intend to create an SD project, you must change the DVD Standard setting in the Project pane of DVD Studio Pro Preferences.

To convert an SD project to an HD project

1 Do one of the following:

- Select the project's name (next to the disc icon) in the Outline tab.
- Click an empty area in the Graphical tab.

The Disc Inspector appears. (Choose Window > Outline if the Outline tab is not visible. Choose View > Show Inspector if the Inspector is not visible.)

2 Click the General tab in the Disc Inspector.

3 Select the HD DVD setting for DVD Standard.

A warning appears stating that you will not be able to convert the project back to the SD DVD standard.

4 Save the project using a new project name.

This ensures the original SD project will remain as it is and not be overwritten.

There are a few things to keep in mind when converting an SD project to an HD project:

- HD projects cannot have MPEG-1 video.
- When you import QuickTime HD assets into an SD project, DVD Studio Pro automatically creates an SD MPEG-2 format version of them using its integrated MPEG encoder. If you then convert the project to an HD project, the HD project continues to use these SD MPEG-2 assets.

  You can have the integrated MPEG encoder create MPEG-2 HD versions of those assets by Control-clicking them, choosing Encoder Settings from the shortcut menu, and then choosing new encoder settings for the asset.

  Once the assets have been reencoded, you can change the resolution of any elements that use them, such as menus or tracks, to match their new HD format.

  Note: If you choose a new bit rate when reencoding an asset to an HD format, the original SD-encoded asset remains available for use by the SD project. If you do not choose a new bit rate, the SD-encoded asset may be overwritten by the HD-encoded asset.
- If your SD project contains QuickTime video assets that use an HD video resolution, you can have the integrated MPEG encoder create MPEG-2 HD versions of those assets by Control-clicking them, choosing Encoder Settings from the shortcut menu, and then choosing new encoder settings for the asset.

The DVD Studio Pro Interface

10

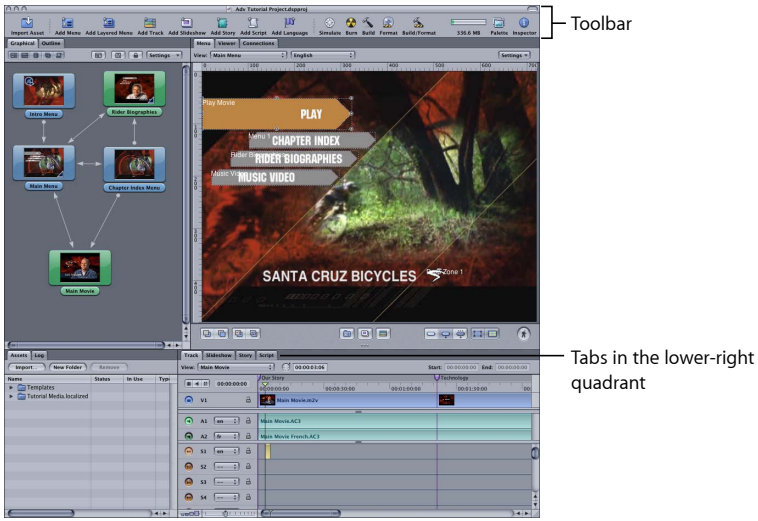
The DVD Studio Pro user interface is designed to provide a flexible environment that can be configured easily to fit the needs and skill levels of all users.

This chapter covers the following:

- Introduction to the DVD Studio Pro Interface (p. 150)
- Configuring the Interface (p. 152)
- Working with the Quadrants (p. 154)
- Working with the Tabs (p. 157)
- Overview of the Quadrant Tabs (p. 161)
- Inspector (p. 167)
- Palette (p. 168)
- Toolbar (p. 174)
- Drop Palette (p. 177)
- Comparing the Outline and Graphical Project Views (p. 177)
- Using the Outline Tab (p. 178)
- Using the Graphical Tab (p. 180)
- Managing Elements Using the Outline and Graphical Tabs (p. 190)

Introduction to the DVD Studio Pro Interface

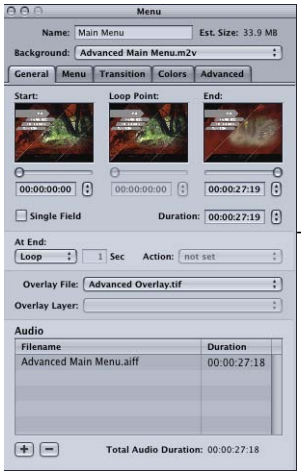
A wide variety of users use DVD Studio Pro, from those who are familiar with iDVD and want to access a few more DVD authoring features, to those who have extensive experience with professional DVD authoring applications.



You can arrange the DVD Studio Pro interface to display as much information as you need. The main interface can be arranged to display from one to four quadrants. Each quadrant can contain one or more tabs. Each tab provides access to specific functions. For example, the Menu tab contains the Menu Editor which you use to create menus. Some tabs will be used by all users while others are only used for advanced features. See Overview of the Quadrant Tabs for information on the tabs.

The interface also includes a customizable toolbar. You can choose which tools appear and which are hidden. See Toolbar for more information.

A floating Inspector displays properties for each project element, with its contents changing based on the currently selected element. For example, if you are working on a menu's buttons, the Inspector displays all properties and settings that apply to buttons. When creating basic DVD Studio Pro projects, you might find it easier to keep the Inspector closed, only opening it when necessary. See Inspector for more information.

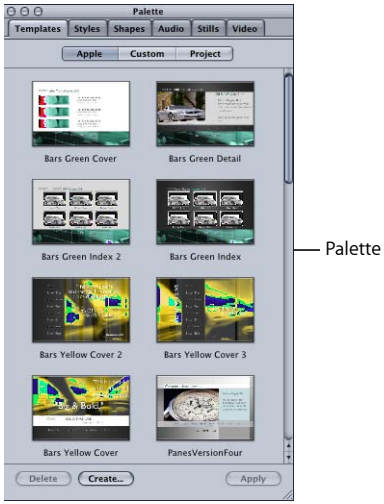


Inspector

A floating Palette provides easy access to features that help you create menus and tracks. These features include:

- Templates and styles
- Shapes
- Media tabs

See Palette for more information.



Configuring the Interface

To make it easy to change between different configurations of the DVD Studio Pro interface, DVD Studio Pro lets you save each configuration. For example, once you configure the quadrants so they are optimized for creating subtitles, you can save that configuration for easy recall later.

Each configuration includes:

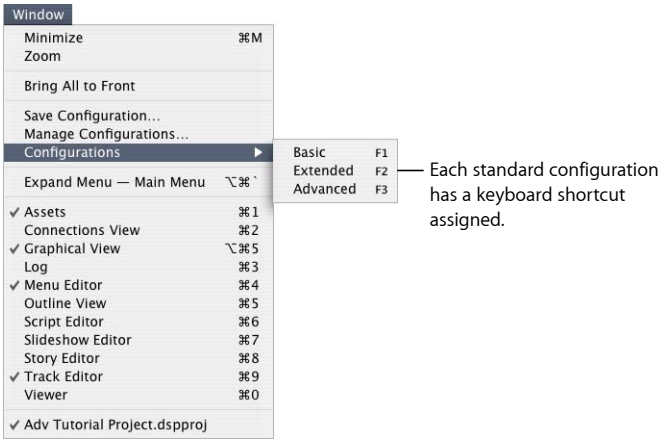
- The current arrangement of the quadrants, including their sizes, the tabs assigned to them, and the tab that is currently visible
- Any tabs that have been torn off into separate windows. See Tearing Off a Tab into Its Own Window for more information.
- The tools in the toolbar
- The column configuration in the Assets tab
- The Inspector and Palette window arrangements, including whether they are visible, their size, and their position

DVD Studio Pro includes several standard configurations you can choose from. These configurations provide three levels of access to the features of DVD Studio Pro—basic, extended, and advanced.

You can use these configurations as they are, perhaps adding a new tool to the toolbar or another tab to a quadrant, or as a starting point for creating your own configurations.

To choose a DVD Studio Pro configuration

- Choose Window > Configurations, then choose a configuration from the submenu.



The submenu lists the supplied configurations plus any that you have created. Each of the first three supplied configurations are automatically assigned keyboard shortcuts F1 through F3. You can assign keyboard shortcuts for any custom configurations in the Manage Configurations dialog.

Once you select a configuration, the DVD Studio Pro interface changes to the new settings. You can make your own changes to the interface and save it as a new, custom configuration.

To save a configuration

1. Configure the interface as needed, including the quadrants and their tabs, the toolbar, the Inspector, and the Palette. See the following for more information:
   - Working with the Quadrants
   - Inspector
   - Palette
   - Toolbar
2. Choose Window > Save Configuration.

   The following dialog appears.

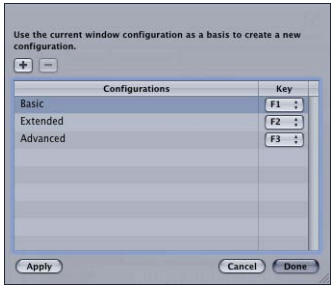
3. Enter a name for the configuration.
4. Click Save.

The new configuration is added to the list of configurations available to your system.

Note: To update a custom configuration, save the updated version using the original version's name.

To manage your configurations

1 Choose Window > Manage Configurations.



A list of existing configurations appears. The Key column lists the "F" key assigned as each configuration's keyboard shortcut.

2 Do any of the following:

- Click the Add (+) button to add a new configuration.
- Delete a configuration by selecting it and then clicking the Delete (–) button.
- Rename a configuration by double-clicking it and entering a new name.
- Assign a keyboard shortcut to a configuration by choosing an "F" key from its Key pop-up menu.

  Important: F9, F10, and F11 are used by default by the Mac OS X Exposé feature. You can reconfigure them in System Preferences. F14 and F15 are used by Mac OS X to control the monitor brightness.
- Apply a configuration by selecting it and then clicking the Apply button.

3 Click Done to close the dialog and save the changes.

Working with the Quadrants

The main DVD Studio Pro interface can contain from one to four quadrants. Each quadrant contains one or more tabs that contain controls for specific functions. You have great flexibility in customizing what is displayed in each quadrant and how it's displayed.

If you choose the basic configuration, one quadrant appears. With the extended configuration, three quadrants appear. See Adding Quadrants to the Basic and Extended Configurations for details on working with the basic and extended configurations.

You can adjust each quadrant's size by dragging its borders, or adjust the size of all four quadrants at once by dragging the point where they intersect. You can "close" a quadrant by dragging its inside edge to the DVD Studio Pro interface edge.

Resizing the Quadrants

You can resize the quadrants in pairs, either horizontally or vertically, or resize them all at once. When all four quadrants are displayed, making individual horizontal or vertical adjustments affects all four quadrants. For example, dragging the horizontal boundary up causes both lower quadrants to get bigger, while both upper quadrants get smaller.

The pointer changes its shape when it is at a quadrant boundary, indicating that you can drag it from there.

You can also quickly make the current quadrant expand to full window.

To make the current quadrant full window

Do one of the following:

- Choose Window > Expand [tab name]. The currently active tab's name is shown, and its quadrant is the one that becomes full window.
- Press Shift-Space bar.
- Press Command-Option-Grave Accent (`, on the same key as the tilde).

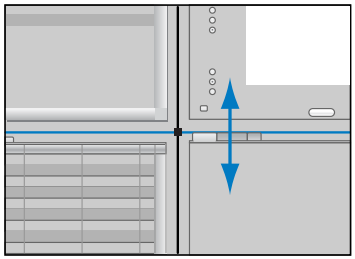
In all cases, you can use these same methods to restore the quadrant to its normal size.

Note: If you perform a function that requires a different tab to appear, the quadrant is automatically restored to its normal size.

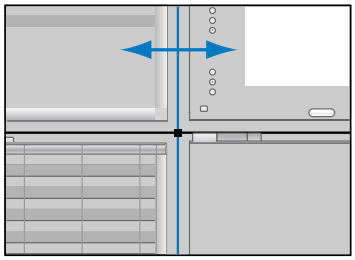
To resize the quadrants manually

Do one of the following:

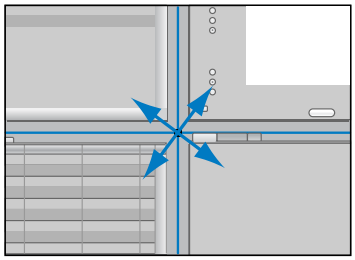
- To change only the heights of the upper and lower quadrants, drag the boundary between the upper and lower halves up or down.



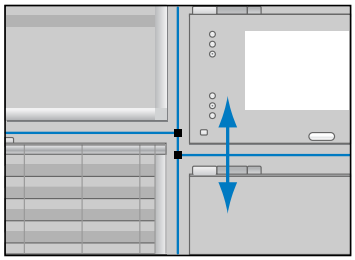
- To change only the widths of the left and right quadrants, drag the boundary between the left and right halves left or right.



- To change both the heights and widths of the four quadrants, drag the point where they intersect.



- To split either the vertical or horizontal boundary, so that you can resize two quadrants while leaving the other two as they are, Option-drag the boundary you want to move. This creates two intersection points, each of which can be dragged as needed. To reconnect the split boundaries, drag one of them so that it aligns with the other, then release it. They are now reconnected and will move as a single boundary.



When a horizontal or vertical boundary gets close to an edge of the user interface, the boundary snaps to that edge, instantly hiding the smaller quadrant. This makes it easy to quickly display only one or two of the quadrants. You can display the hidden quadrants by dragging the edge back toward the center of the window.

Adding Quadrants to the Basic and Extended Configurations

There are two ways to add quadrants to the basic and extended configurations: Choose a different configuration or drag their edges in toward the center.

The basic configuration is actually just the upper-right quadrant with its left and bottom boundaries dragged to the edges of the interface. To add a quadrant to the left half of the interface, drag the left edge toward the center. To add a quadrant to the bottom half, drag the bottom edge toward the center.

The extended configuration has the lower-left quadrant hidden. To add it, drag the lower-left edge toward the center.

Working with the Tabs

The quadrants hold the tabs that contain the primary controls of the DVD Studio Pro interface. You can select a tab to make it active, move the tab to a different quadrant, or "tear off" the tab to make it available in its own window.

Viewing a Tab's Contents

When you have multiple tabs in a quadrant, only one is active and can be seen. There are several methods you can use to make a tab active so that it appears in front of the others.

To view a tab's contents

Do one of the following:

- Click the tab you want to view.
- Choose Window > [name of tab].
- Use the tab's keyboard shortcut. For a compete list of keyboard shortcuts, see Keyboard Shortcuts.

Note: If a tab is hidden, choosing it from the Window menu or using the keyboard shortcut makes it appear as a separate window.

In many cases, selecting an element in the Outline or Graphical tab automatically activates related tabs (if they are assigned to a quadrant). For example, if you double-click a menu in the Outline tab, the Menu tab becomes active.

Rearranging Tabs Within a Quadrant

You can change the order in which tabs appear within a quadrant.

To change the order of tabs

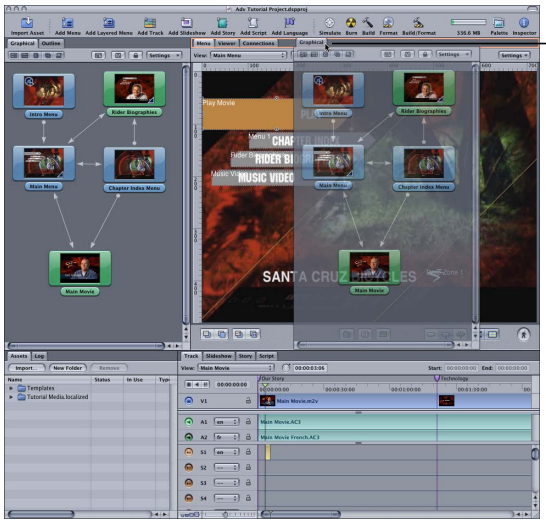
- Drag a tab to a new position.

Moving a Tab to a Different Quadrant

You can move a tab from one quadrant to another. This allows you to group tabs that work best for you. For example, you may group the tabs so that you can reduce the number of quadrants that appear and see just the tabs you use most.

To move a tab to a different quadrant by dragging

- Drag a tab to the new quadrant's tab area.



Dragging the Graphical tab to the upper-right quadrant

As you drag the tab, an outline surrounds the tab area in the quadrant to which you're moving the tab. You can drag the tab to a specific position among the quadrant's current tabs.

To move a tab to a quadrant using a shortcut menu

- Control-click an empty part of the tab area in the quadrant you want to add a tab to, then choose the tab to add from the shortcut menu. (Tabs with checkmarks are already part of the quadrant.)

The tab you choose is removed from its existing location and added to the end of the quadrant's current tabs. (If the tab was torn off into a separate window, its window is closed as long as there are no other tabs in the window.)

Tearing Off a Tab into Its Own Window

You can "tear off" a tab so that it appears in its own window. This is useful if you have a large computer display or use multiple displays and are able to spread out. It is also useful if you have a small display and a limited workspace, because it allows you to have larger windows without resizing the quadrants.

To tear off a tab

Do one of the following:

- Drag a tab to a position outside of the immediate tab area.
- Control-click the tab, then choose Tear Off Tab from the shortcut menu.
- Control-click in the area next to the tabs in its quadrant, then choose the tab's name from the shortcut menu.

The tab's window can be sized and positioned as needed. You can also drag additional tabs to the window.

Restoring a Torn-Off Tab to a Quadrant

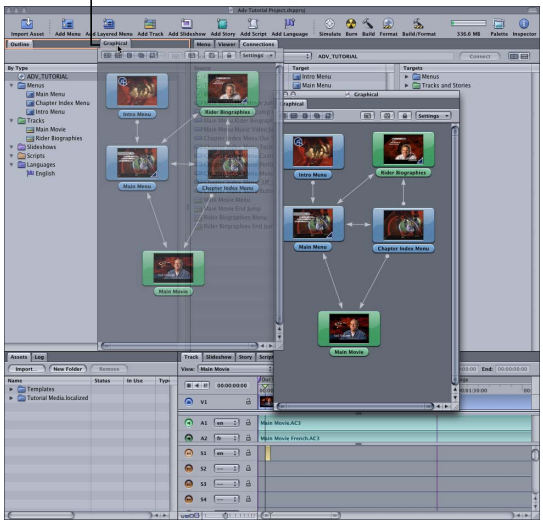
You can add a tab back into a quadrant using several methods.

To restore a tab to its quadrant

Do one of the following:

- Drag the tab's name to a quadrant. The tab snaps back into place and its window closes (as long as the window has no other tabs).

Note: This is different from dragging the window's title bar, which just repositions the window.



- Control-click an empty area of a quadrant's tab area, then choose the tab from the shortcut menu. You can also do this if the tab's window has been closed.

What Happens If You Close a Torn-Off Tab's Window?

If you close a tab's window by clicking the close button in the upper-left corner of the window, the tab does not automatically get added back to a quadrant, and it is no longer displayed.

You can either reopen the window or add the tab to one of the quadrants (as described in the previous section, Restoring a Torn-Off Tab to a Quadrant).

To reopen the tab in its own window

Do one of the following:

- Choose Window > [the tab name].
- Press the tab's keyboard shortcut.
- Double-click an element that requires the tab in the Outline or Graphical tab.

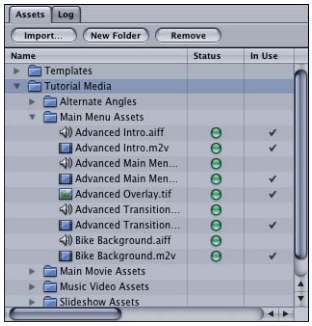
The tab opens in its window at the same position and size as when it was closed.

Overview of the Quadrant Tabs

Following is an alphabetical list of the tabs that can be included in the quadrants.

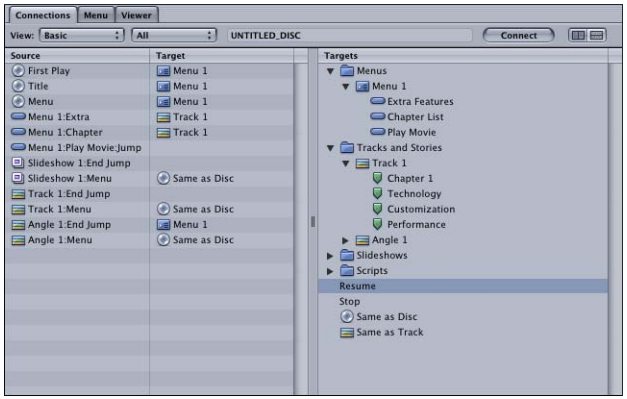
Assets Tab

The Assets tab is a central location for managing the assets used in your project. It displays extensive information about each asset in columns that you can configure to see just the information you want. Additionally, you can create folders and subfolders to help organize assets when you are working with large projects. See About the Assets Tab for details on working with the Assets tab.



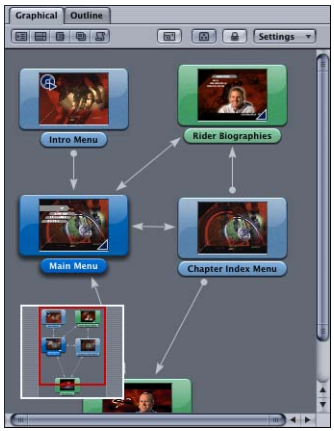
Connections Tab

The Connections tab provides a comprehensive tool for linking elements—such as a menu button and a track marker—to each other. While there are a number of ways to make most connections, including directly in the Menu Editor, the Connections tab is the only way to access some advanced features. See Establishing Connections for details on working with the Connections tab.



Graphical Tab

The Graphical tab provides a tile-based view of all elements in your project. You are able to arrange the tiles and display lines indicating how they connect to each other. This makes it possible to create a flowchart of your project, which can be printed and used for project planning and approvals. See Using the Graphical Tab for more information.



Log Tab

You can use the Log tab to see status information for a variety of functions:

- *Build:* Displays messages generated while building your project's files in preparation for writing them to a DVD disc.
- *Encode:* Displays messages generated by the integrated MPEG and AIFF encoders.
- *Simulate:* Displays messages generated while using the Simulator with your project.

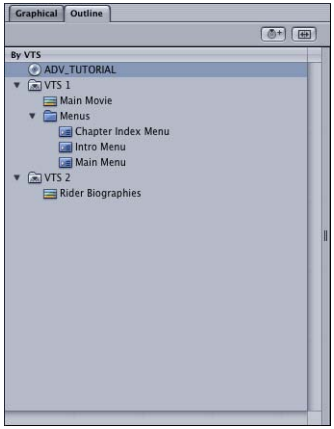
Menu Tab

The Menu tab contains the Menu Editor. You use the tools in the Menu Editor to build your project's menus. The editor contains a display to show the menu's video contents, along with controls to configure the display. See About the Menu Editor for details on using the Menu Editor.

Outline Tab

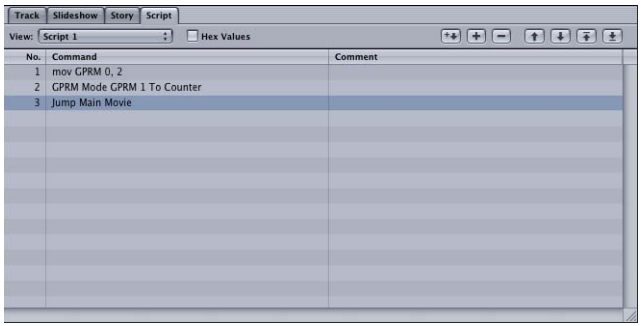
The Outline tab provides an organized list of all project elements. Each element is grouped by type, such as Menus or Tracks, in sections that function a bit like file folders. Next to each section name is a disclosure triangle—clicking the triangle allows you to hide or display the elements listed in that section. See Using the Outline Tab for details on using the Outline tab.

The Outline tab also contains the VTS Editor. The VTS Editor (Video Title Set Editor) allows you to manually place project elements into specific VTS blocks. See VTS Editor for more information.



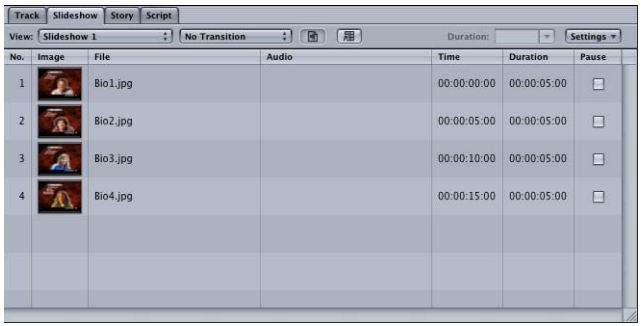
Script Tab

The Script tab contains the Script Editor. You use the Script Editor to add and manage commands in your scripts. The editor lists each command and its step number. See The Scripting User Interface for details on using the Script Editor.



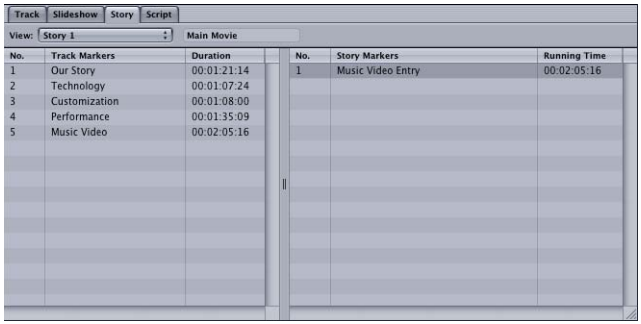
Slideshow Tab

The Slideshow tab contains the Slideshow Editor. You use the tools in the Slideshow Editor to create and edit slideshows. The editor contains thumbnails of each slide in display order, along with the slide's duration. You can also add audio to your slideshow in the editor. See Slideshow Editor Settings for details on using the Slideshow Editor.



Story Tab

The Story tab contains the Story Editor, which you use when creating a story for a track. To create a story, you choose which sections of the track to play, as defined by chapter markers. See Using the Story Editor for details on using the Story Editor.



Track Tab

The Track tab contains the Track Editor. The Track Editor displays all streams associated with a track (video, audio, and subtitle) in a linear, timecode-based manner. It provides tools for adding and editing markers. It allows you to trim and combine multiple assets on a single stream. See Configuring the Track Editor for details on using the Track Editor.

Viewer Tab

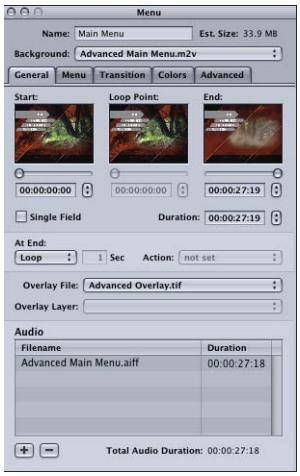
The Viewer tab lets you view your project's elements. See Viewing a Track for details on using the Viewer tab.

The Viewer tab is also used when editing subtitles. You use the tools along the bottom to build subtitles within DVD Studio Pro or to view subtitles imported from an external source. The display shows both the subtitle and the first frame of video that it appears over. See Creating Subtitles with DVD Studio Pro.

Inspector

The Inspector is a floating window that displays the properties of the element you are currently working with. In some cases, it contains multiple tabs, with the properties grouped by type and function.

With the exception of the Palette, the Inspector always has the highest viewing priority of the DVD Studio Pro windows—it is never covered by any other DVD Studio Pro window. (If the Inspector and Palette are in the same area of the screen, the one last selected will cover the other.) Because it is always on top of the other interface elements, you may find it useful to keep the window closed until you need it.



You can hide and show the Inspector to suit your needs.

To hide the Inspector

Do one of the following:

- Choose View > Hide Inspector (or press Command-Option-I).
- Click the close button in the upper-left corner of the window.
- Click Inspector in the toolbar.

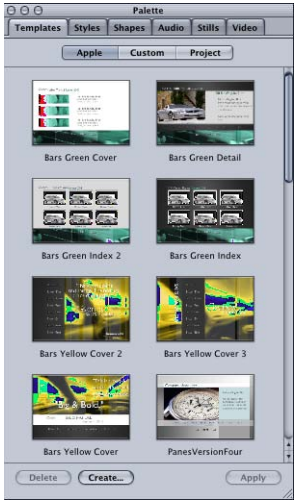
To show the Inspector

Do one of the following:

- Choose View > Show Inspector (or press Command-Option-I).
- Click Inspector in the toolbar.

Palette

The Palette provides easy access to the templates, styles, and shapes used to create menus. Additionally, the Palette includes three media tabs—Audio, Stills, and Video—that can make it easier to locate the assets you want to import.



Hiding and Showing the Palette

With the exception of the Inspector, the Palette always has the highest viewing priority of the DVD Studio Pro windows—it is never covered by any other DVD Studio Pro window. (If the Palette and Inspector are in the same area of the screen, the one last selected will cover the other.) Because it is always on top of the other interface elements, you may find it useful to keep the window closed until you need it.

To hide the Palette

Do one of the following:

- Choose View > Hide Palette (or press Command-Option-P).
- Click the close button in the upper-left corner of the window.
- Click Palette in the toolbar.

To show the Palette

Do one of the following:

- Choose View > Show Palette (or press Command-Option-P).
- Click Palette in the toolbar.

Templates and Styles Tabs

A template comprises up to five styles that define most aspects of a menu. You can create your own templates and styles or use those that DVD Studio Pro provides. You can apply all or just selected parts of a template or style to a menu or a selected part of a menu. This makes it easy to create a series of menus using an identical button layout and background.

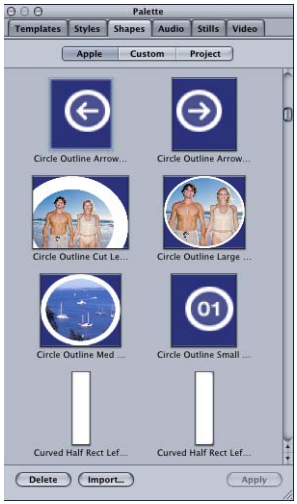
See Using Templates, Styles, and Shapes to Create Your Menus for details on using templates and styles to create your menus.

Click to select the category of styles you want to view.

Shapes Tab

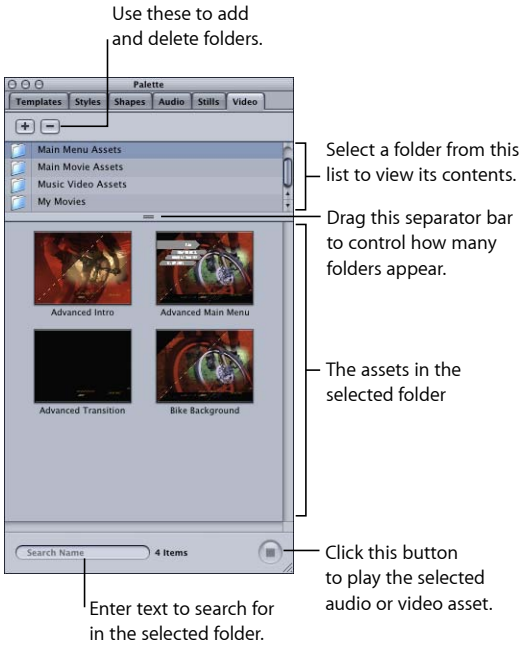
Shapes are graphics elements that you can add to your menu as either a button or a drop zone. You can drag them directly from the Shapes tab to your menu background or choose the shape to use in the Button Inspector's Style tab or in the Drop Zone Inspector. You can use the shapes that DVD Studio Pro provides, or you can create and import your own.

See Creating Shapes for details on creating shapes and Adding Shapes to a Menu for details on using them in your menus.



Media Tabs

The Palette includes a set of three media tabs—labeled Audio, Stills, and Video—that display DVD Studio Pro–compatible assets located in folders that you specify. You can add these assets to your project by dragging them from the Palette to the Assets tab, Menu Editor, or anywhere else you can directly add assets.



The media tabs, and the folders assigned to them, are available to all DVD Studio Pro projects. They provide an additional method to organize your assets, and are especially useful for accessing assets you use often.

Important: Assets that appear in the media tabs are not automatically part of a project in DVD Studio Pro. You must add them to a project by dragging them to it. You should think of the media tabs as being a specialized Finder window.

Adding Folders to the Folder List

The folder list appears at the top of the three media tabs. Before you can see your assets in any of the media tabs, you must add one or more folders to the folder list.

To add a folder to the folder list

1 Click the tab of the asset type to add a folder to (Audio, Stills, or Video).

2 Add a folder by doing one of the following:

- Drag a folder from a Finder window to the folder list.

Note: If you click outside of DVD Studio Pro without dragging a folder to a media tab, the Palette disappears and you will need to reselect DVD Studio Pro to see the Palette again.

- Click the Add (+) button. A folder selection dialog appears. Select the folder or folders to add and click Add.
- Control-click in the list where you want the added folder to go, then choose Add Folder from the shortcut menu. A folder selection dialog appears. Select the folder or folders to add and click Add.

The folder appears in the folder list. You can now select the folder to see a list of its assets.

Note: Only assets in the selected folder appear. Assets in subfolders (nested folders) are ignored.

Managing the Folder List

There are different ways to make the folder list easier to use:

- You can change the folder list display order to have folders you use frequently appear at the top.
- You can remove folders that are no longer needed, such as those specific to a project that is completed.

To change the folder list display order

1. Click the tab whose display order you want to change (Audio, Stills, or Video).
2. Drag the folder to be moved slightly to the right or left, then up or down to its new location. A black line appears to show where the folder will be placed when you release it.

Note: Dragging straight up or down does not move the folder—it selects the folders the pointer moves over and shows their contents in the assets area.

To remove a folder from the folder list

1. Click the tab to remove the folder from (Audio, Stills, or Video).
2. Select the folder or folders to remove in the folder list.
3. Do one of the following to remove the folder:
   - Click the Delete button.
   - Control-click the folder, then choose Remove Folder from the shortcut menu.
   - Press the Delete key.

The folder is removed from the folder list.

Note: This does not delete the folder or its assets from your hard disk and has no effect on assets that may have been added to your project from this folder.

Viewing and Using Assets

Once you have added folders containing compatible assets, you can show the assets and drag them to your project.

To show a folder's assets

- Select the folder that contains the assets you want to see. You can select multiple folders by dragging the pointer over a group of folders, holding down the Shift key and clicking the folders (if they are contiguous), or holding down the Command key and clicking the folders (if they are not together).

  You can change the Palette's size to control how many assets you can see. You can also drag its separator bar to control the sizes of the folder list and assets area.

  There are five columns in the Audio tab (Name, Artist, Length, Sample, and Type) that show additional information about each asset. Similar to the columns in the Assets tab, you can change the column order and size, and sort the list based on the column heading you click. See Managing Columns in the Assets Tab for more information.

To play a folder's video or audio asset

- Click the Play button in the bottom-right corner of the Audio or Video tab. Click it a second time to stop playback.

  Audio assets play through your system's audio setup.

  Video assets play in their thumbnail image. The General pane in DVD Studio Pro Preferences contains a setting that allows you to choose small or large thumbnail images, which may make viewing the video easier. Also, audio will play along with the video if it is a QuickTime file with video and audio together or an MPEG file with an audio file in the same folder with the same root name.

To use the assets in your project

- Drag the asset to the Menu Editor, Assets tab, or to any other project element within DVD Studio Pro that allows you to drag assets in.

  You can select and drag multiple assets. You can also drag a folder from the folder list to the project element to create a slideshow.

  Depending on the "Find matching audio when dragging" setting in the Track pane in DVD Studio Pro Preferences, when you drag an MPEG video asset to an element, DVD Studio Pro can automatically add the companion audio asset to the element as long as it is in the same folder and has the same root name as the video asset. Press the Command key after you start dragging to override the preferences' setting for dragging a video file. When you drag a QuickTime asset that also has audio from the Video tab, it is treated like a video/audio pair.

Toolbar

The DVD Studio Pro interface includes a toolbar that can be customized to display exactly the tools you need. The toolbar provides one-click access to a variety of functions, such as creating menus and slideshows or simulating your title.

You can customize the toolbar in a variety of ways, including selecting the tools to include, rearranging them, and choosing whether both the tool's icon and text appear.

Note: Choosing a new user configuration from the Window menu also changes the toolbar contents. Be sure to save a new user configuration once you are finished customizing the toolbar.

Hiding and Showing the Toolbar

You can choose to hide the toolbar completely.

To hide the toolbar

- Choose View > Hide Toolbar.

To show a toolbar that has been hidden

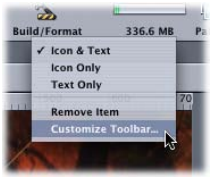
- Choose View > Show Toolbar.

Managing the Toolbar

DVD Studio Pro provides a simple drag-and-drop interface for managing the toolbar.

To manage the toolbar

1. To display the toolbar palette, do one of the following:
   - Choose View > Customize Toolbar.
   - Control-click the toolbar, then choose Customize Toolbar from the shortcut menu.



2. To add tools to the toolbar, drag their icons from the toolbar palette to their new position in the toolbar.

3. Do one of the following to remove tools from the toolbar:
   - Drag the tool you want to remove out of the toolbar.

- Control-click the tool you want to remove and choose Remove Item from the shortcut menu.

4 To change the order of the tools in the toolbar, drag each tool to its new position.

5 To set the toolbar to a default configuration, drag the default set of tools to the toolbar.

6 Do one of the following to control whether each tool's icon and text appear in the toolbar:

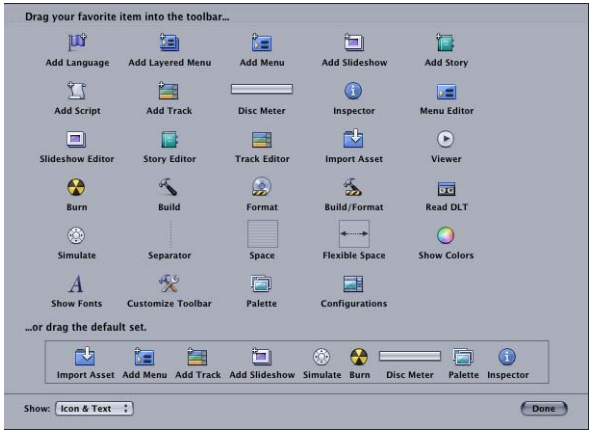
- Choose Text Only, Icon Only, or Icon & Text from the Show pop-up menu in the toolbar palette.
- Control-click the toolbar and choose Text Only, Icon Only, or Icon & Text from the shortcut menu.

7 Click Done when you are finished configuring the toolbar.

Toolbar Items

The following items (listed in alphabetical order) can appear in the toolbar.

Note: With the exception of Space, Flexible Space, and Separator, you can have only one of each item in the toolbar.

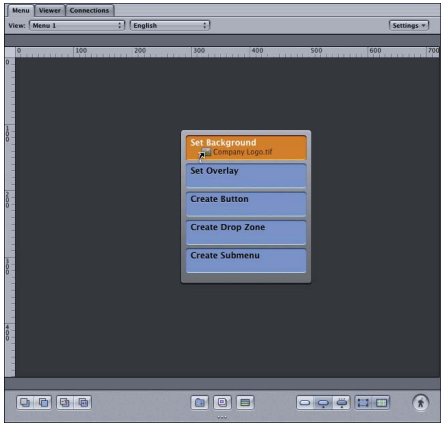


- *Add Language:* Adds a new menu language to the project.
- *Add Layered Menu:* Adds a new layered menu to the project.
- *Add Menu:* Adds a new standard menu to the project.
- *Add Slideshow:* Adds a new slideshow to the project.
- *Add Story:* Adds a story to the currently selected track (or the first one, if none is currently selected).
- *Add Script:* Adds a new script to the project.
- *Add Track:* Adds a new track to the project.

- *Build:* Compiles your project and creates a video title set (VIDEO_TS folder) of your project.
- *Build/Format:* First builds the video title set, then writes it to a DVD drive, DLT drive, or as a disk image to a hard disk.
- *Burn:* Builds the video title set and writes it to your DVD burner using the current Disc Inspector settings.
- *Configurations:* Opens the Configuration Manager dialog so that you can manage or apply an interface configuration.
- *Customize Toolbar:* Opens the toolbar palette.
- *Disc Meter:* Displays the disc meter. A progress bar shows both the amount of disc space used and what is still available (based on the Disc Media you select in the Disc/Volume tab in the Disc Inspector). The number underneath the progress bar shows the amount of space used.
- *Flexible Space:* Inserts a space into the toolbar that automatically expands to fill any existing empty space. This ensures that there are tools at the left and right edges of the toolbar.
- *Format:* Writes the video title set to a DVD drive, Digital Linear Tape (DLT) drive, or as a disk image to a hard disk.
- *Import Asset:* Opens the Import Asset dialog, allowing you to select assets to import into the project.
- *Inspector:* Displays the Inspector.
- *Menu Editor:* Displays the Menu Editor.
- *Palette:* Displays the Palette in its last configuration.
- *Read DLT:* If a DLT drive is connected and a DLT tape inserted, reads the tape contents and writes them to the designated drive.
- *Separator:* Inserts a vertical bar into the toolbar, allowing you to group tools.
- *Show Colors:* Opens the Colors window.
- *Show Fonts:* Opens the Fonts window.
- *Simulate:* Opens the project Simulator, allowing you to try out your project before actually building it.
- *Slideshow Editor:* Displays the Slideshow Editor.
- *Space:* Inserts a fixed space into the toolbar. This allows you to group tools by adding a fixed space between them.
- *Story Editor:* Displays the Story Editor.
- *Track Editor:* Displays the Track Editor.
- *Viewer:* Displays the Viewer tab.

Drop Palette

The Drop Palette appears in the Menu Editor when you drag an asset or project element to it. Once you stop moving the pointer, the Drop Palette appears, allowing you to choose how to use the asset within the menu. The contents of the Drop Palette vary, depending on the asset or element type, how many assets you drag, and whether you have dragged to an existing button.



See Options in the Drop Palette for Standard Menus and Options in the Drop Palette for Layered Menus for a complete listing of the options in the Drop Palette.

Comparing the Outline and Graphical Project Views

DVD Studio Pro includes two tabs you can use to view and work with your project: the Outline tab and the Graphical tab. Each tab has its own advantages, and you will most likely find yourself using both as you create your project.

The Outline and Graphical tabs both:

- Show all project elements
- Allow you to select an element so that you can work on it
- Allow you to rename an element
- Allow you to add, delete, and duplicate elements
- Allow you to show the selected element in the Simulator
- Automatically create new elements when assets are dragged to the tabs, or modify existing elements if assets are dragged to an existing element in the tabs
- Allow you to drag elements to the Menu Editor to establish connections

The Outline tab also has these capabilities:

- It includes the menu language elements that you use when configuring your menus to support multiple languages.
- It includes the VTS Editor that provides extensive control over how your project's elements are burned to a DVD.

The Graphical tab also has these capabilities:

- You can choose whether to view all elements or just specific types.
- Elements that use the transitions feature are marked.
- The element assigned as First Play has a special icon.
- You can view connection lines that show which elements have targets set to other elements.
- You can arrange the tiles to provide a flowchart view of the project.
- You can print the Graphical tab.
- You can set a flag on specific elements, making it easy to distinguish them.

See Using the Outline Tab and Using the Graphical Tab for detailed information on using each tab. See Managing Elements Using the Outline and Graphical Tabs for information on using the tabs to manage your project's elements.

See Dragging Assets to the Outline and Graphical Tabs for information on what happens when you drag assets directly to the Outline or Graphical tab.

Using the Outline Tab

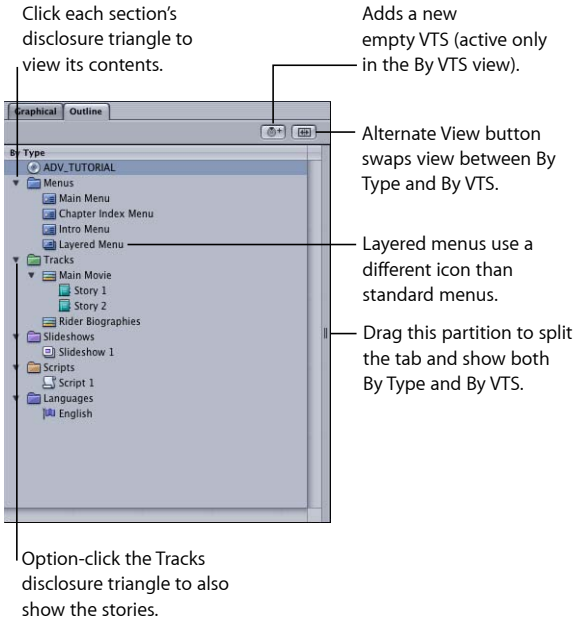
The Outline tab provides a simple list view of your project's elements. It contains two displays: By Type and By VTS. You can click the Alternate View button to switch between the two displays or drag the partition to show both displays at the same time.

The elements in the By VTS and By Type displays are very similar and can be used to do many of the same things. For example, double-clicking an element in either display opens it in its editor and inspector. (Selecting an element in one display also selects that same element in the other.)

The primary difference is in how they are organized.

- *By VTS:* Lists the elements based on the VTS they belong to. A VTS can have only one track (which can also have stories) or one slideshow, but it can have multiple menus and scripts. The primary use of the By VTS display is to control how your project's elements are written to a DVD. See VTS Editor for more information.
- *By Type:* Lists the elements based on their type (menus, tracks, slideshows, and scripts). See Using the Outline Tab for more information on using the By Type display.

Note: The Languages section in the By Type display does not represent actual elements—it represents languages that can be used for the menus. It does not appear in the By VTS display because it is not specific to a VTS.



Selecting Elements

The most common way to use the Outline tab is to select a project element so that you can configure it. Selecting an element changes the Inspector and the element's editor to display settings for that particular element. Double-clicking an element brings the editor to the front of the DVD Studio Pro interface, the same as if you clicked its tab.

You can select several elements at once by holding down the Command key while clicking the elements, or select all elements by pressing Command-A. You can delete, duplicate, and save descriptions of a group of elements.

If you hold the pointer over an element in the Outline tab, a tooltip appears that shows additional information about the element, such as what type of menu it is or how many streams it has.

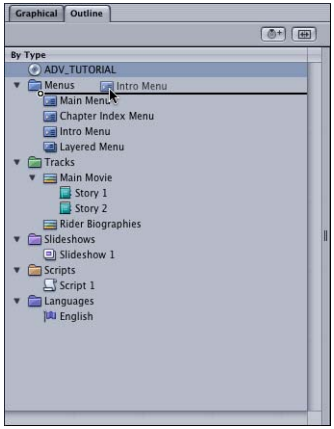
Moving Elements in the By Type Display

You can move an element from one position to another within the same section.

Note: The order of the elements in the By Type display does not affect how the elements are written to the DVD.

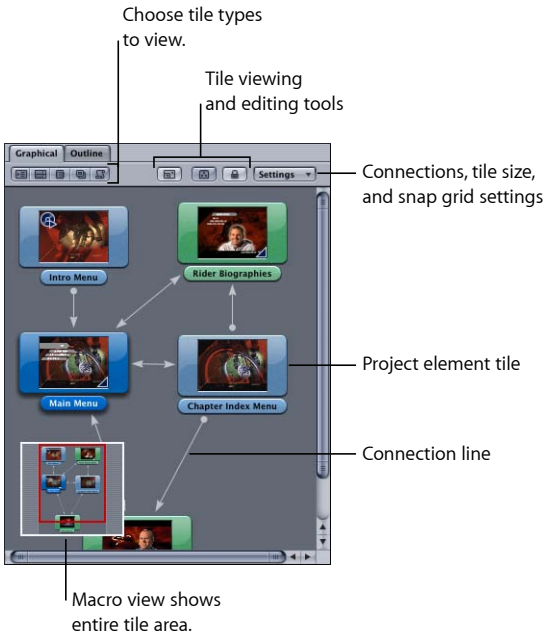
To change an element's position in the Outline tab's By Type display

- Drag the element to its new position. As you drag, a line appears between elements to indicate where the dragged element will be moved when you release it.



Using the Graphical Tab

The Graphical tab uses a tile-based interface to show a project's elements.



Graphical Tab Introduction

The Graphical tab uses tiles to represent each element in your project. Similar to the Outline tab, you can use the Graphical tab to select elements to work with and can rename the elements. Each tile contains a thumbnail image that represents the element. You are able to position the tiles as needed and can choose to view either large or small versions of the tiles. You can also choose to view connection lines between the elements.

Graphical Tab Viewing Options

Depending on the size of your project, the Graphical tab can have a large number of tiles and not be able to fit in the tab's window. You can make the tab's view larger so that more tiles can be seen, zoom out to fit the tiles to the window, or use scrollers to view a portion of the tile area.

To make the tab's view larger

Do one of the following:

- With the Graphical tab selected, press Shift–Space bar.

  The tab's contents fill the DVD Studio Pro interface. Press Shift–Space bar again to restore the tab to normal size. If you double-click a tile, the tab's view reverts to normal size so that you can see the editors.

  Note: If you hold down Shift–Space bar, the large view becomes temporary and will revert back to normal once you release the keys.

- Press Command–Option–Grave Accent (`, on the same key as the tilde).
- Drag an edge of its quadrant.

  See Resizing the Quadrants for more information.

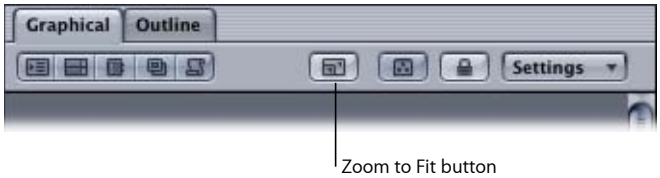
- Tear the tab off into its own window.

  See Tearing Off a Tab into Its Own Window for more information.

To fit the tiles to the current window size

Do one of the following:

- Press Shift-Z.
- Click the Graphical tab's Zoom to Fit button.



When there are more tiles than can be displayed in the Graphical tab, scrollers appear that allow you to control which part of the tile area shows. The scrollers also allow you to zoom in or out on the tile area.

To use the Graphical tab scrollers
Do one of the following:

- Drag them to control which part of the tile area you can see.
- Drag the ends of the horizontal scroller to zoom in or out on the tile area.

There are also several zoom and positioning keyboard shortcuts available.

To zoom using keyboard shortcuts
Do one of the following:

- Press Z, then click the area of the Graphical tab that you want to zoom in on. Press Option-Z, then click to zoom out.
- Press Z, then drag the pointer across the area that you want to zoom in on.
- Press the Space bar. The pointer changes to a hand that you can use to control which part of the tile area is visible, similar to using the scrollers.
- Press Command–Plus Sign (+) to zoom in and Command–Hyphen (-) to zoom out on the Graphical tab, maintaining its center position.

Using the Macro View

The Graphical tab includes a macro view capability. The macro view is a small display showing a view of the entire tile area. It includes a visible-view rectangle that indicates the part of the tile area currently showing. You can drag the visible-view rectangle to choose the part of the tile area that shows, and you can change the rectangle's size to zoom in or out.

Displaying the Macro View

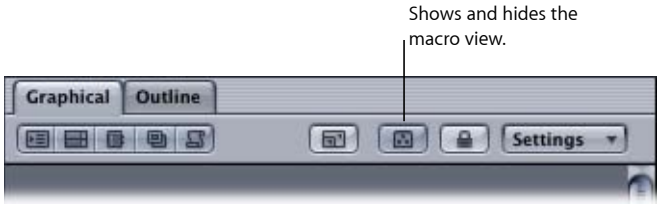
The macro view floats over the top of the Graphical tab. There are several methods you can use to display or hide the macro view.

To display and hide the macro view
Do one of the following:

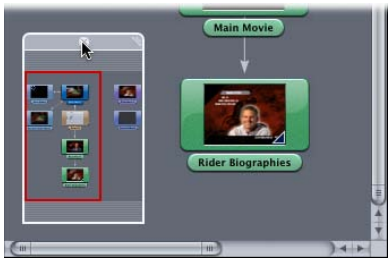
- Press M.

Note: You can temporarily display the macro view by holding down the M key.

- Click the Graphical tab's macro view button.



- Position the pointer over the macro view (which causes the title bar to appear), then click the hide symbol in the macro view's title bar to hide the macro view.



Note: The title bar can appear on the top or bottom of the macro view, depending on where the pointer is.

Working with the Macro View

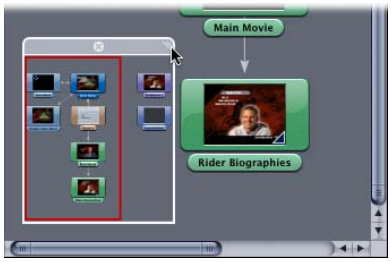
You are able to position the macro view anywhere within the tab, but you cannot move it outside the tab's boundaries.

To move the macro view within the Graphical tab

- Position the pointer over the macro view (which causes the title bar to appear), then drag the title bar to the new position.

To change the size of the macro view display

- Drag the resize corner of the title bar.



The visible-view rectangle can be moved and resized to control the tile area that shows.

To use the visible-view rectangle

Do one of the following:

- Click within the rectangle to drag it to a new position.
- Click outside the rectangle to have the rectangle jump to a new position, with the point you clicked being as close as possible to the rectangle's center.
- Drag a corner of the rectangle to change its size. Making the rectangle bigger zooms out on the tile area, showing more tiles. Making the rectangle smaller zooms in on the tile area, showing fewer tiles.

Selecting and Managing Tiles

You can use several tools to select and arrange tiles—many are the same as those used with buttons in the Menu Editor. There are also a variety of methods you can use to add, delete, and copy tiles.

Selecting Tiles

There are several reasons you might want to select one or more tiles:

- Selecting a tile makes it the current element, and opens it in its editor.
- Selecting one or more tiles allows you to arrange them.
- Selecting one or more tiles allows you to delete or copy them.

To select one or more tiles

Do one of the following:

- Click a tile to select it. Any other selected tiles are deselected.
- Press the Shift or Command key, then click a tile to select it. Any other selected tiles remain selected.
- Drag the pointer over a group of tiles. This creates a selection rectangle that selects all tiles it touches.
- Choose Edit > Select All (or press Command-A) to select all tiles. You can also choose Edit > Deselect All (or press Command-Shift-A) or click an empty part of the Graphical tab to deselect all tiles.

Moving Tiles by Dragging

You can move a tile or group of tiles once they are selected by simply dragging them. If connections are showing, they move with the tiles. You can also use the arrow keys to move selected tiles.

If you move a tile to an edge of the Graphical tab, the tile area scrolls to show its new position. If the edge of the tile area is reached, it is automatically expanded to accommodate the tile's new position.

To make it easier to see a larger area while dragging a tile, you can press the Z key after you start dragging the tile to temporarily zoom out.

You can enable a snap grid to make it easier to organize the tile in straight lines and columns.

To enable the snap grid

- Choose Snap to Grid from the Graphical tab's Settings pop-up menu.

You may want to drag a tile to the Menu Editor. This is an easy way to link either a new or an existing button in the current menu to the element being dragged.

To drag an element to the Menu Editor

1. Click the element's tile and hold down the mouse button for a moment without moving the tile.

   A transparent tile appears.

2. Drag the transparent tile to the Menu Editor.

You can also drag multiple tiles to the Menu Editor by selecting them before holding down the mouse button when the pointer is on one of them.

Using Distribute Objects

The distribute objects feature allows you to select a group of tiles and evenly space them between each other using one of four methods:

- *Horizontally:* Only active when more than one tile is selected. Tiles in between the tile furthermost to the left and furthermost to the right are positioned evenly horizontally.
- *Vertically:* Only active when more than one tile is selected. Tiles in between the tile furthermost to the top and furthermost to the bottom are positioned evenly vertically.
- *By Type:* With no tiles selected, all tiles are affected; with one or more tiles selected, only the selected tiles are affected. Arranges the tiles in evenly spaced rows and columns based on their types. The type order is:
  - Menus
  - Layered menus
  - Tracks
  - Stories
  - Slideshows
  - Scripts
- *Autolayout:* With no tiles selected, all tiles are affected; with one or more tiles selected, only the selected tiles are affected. The tiles are arranged based on connections, types, and quantity.

To use the distribute objects feature

1 Depending on the distribution method you intend to use, select the group of tiles to distribute. See Selecting and Managing Tiles for details on how to do this.

2 Choose Arrange > Distribute Objects, then choose the distribution method to use (Horizontally, Vertically, By Type, or Autolayout).

Locking the Tile Positions

You can lock the tile positions and prevent accidentally rearranging them.

To lock the tile positions

Do one of the following:

- Choose Arrange > Lock All Tiles (or press L).
- Click the Graphical tab's Lock button.

You can use the same button and keyboard shortcut to unlock the tiles. If you need to move any tiles while they are locked, you can press the Option key, then drag the tiles to the new location.

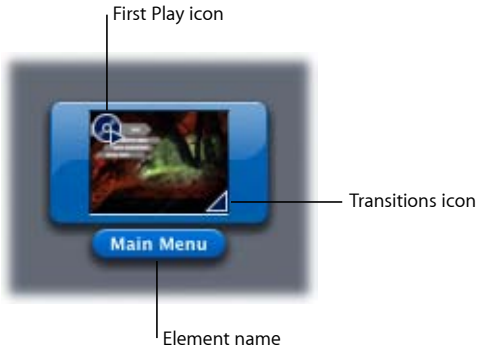
While the tile positions are locked, you are still able to change your view of the tiles by zooming or using the scrollers. You can also change the connections view.

About the Tiles

There are six different tile types that can appear in the Graphical tab. Each type uses a different color to differentiate it:

- *Menu:* Light blue
- *Layered menu:* Dark blue
- *Track:* Green
- *Story:* Teal
- *Slideshow:* Purple
- *Script:* Brown

Each tile has a thumbnail image of the element. The aspect ratio of the thumbnail changes to indicate whether the element uses 4:3 or 16:9 assets. A tooltip showing information about the element appears when you position your pointer over it.



The element designated as First Play has an icon added to it. Elements that are using the transitions feature also have icon indications.

Tile Sizes

You can choose large or small sizes to view the tiles.

To change the tile size

- Choose Small Tiles or Large Tiles from the Graphical tab's Settings pop-up menu.

Flagging Tiles

You can flag a tile so that it stands out from the others. For example, you might want to flag tiles for elements that still require assets or use DVD@CCESS.

To flag one or more tiles

Do one of the following:

- Control-click a tile, then choose Flag from the shortcut menu. This also selects this tile and deselects any others that are selected.
- Shift-Control-click a tile, then choose Flag from the shortcut menu. This also selects this tile and flags any others that are selected.
- Position the pointer over a tile and press F. It does not matter whether the tile is selected or not.
- Select a group of tiles to be flagged, then choose Edit > Flag Tiles (or press F).
- Select a group of tiles to be flagged, Control-click an empty area in the tile display, then choose Flag from the shortcut menu.

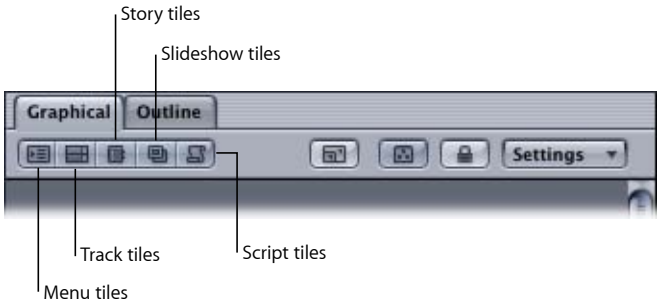
You can use any of these methods to also turn off the flags on one or more tiles.

Viewing Specific Tile Types

You can choose specific tile types to view. For example, you may only want to see the slideshows.

Note: If you choose to hide a tile type, all connections to that tile type are also hidden.

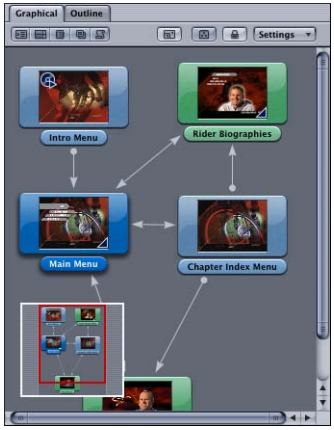
The Graphical tab's tile type Show/Hide buttons control which tiles are visible and which are hidden.



Clicking a button hides its tile type and the button background becomes lighter. Clicking the button again shows its tile type and the button background becomes darker.

Viewing Connections

You can configure the Graphical tab to show lines indicating which elements are connected to each other. Arrows indicate which element is the target.



The connection lines are useful when you want to view the project as a flowchart. They can also be helpful to ensure you have not inadvertently left out an intended connection.

Note: You cannot make connections or change existing connections in the Graphical tab.

You can customize how many connections appear with the Graphical tab's Settings pop-up menu.

- *No Connections:* No connection lines appear.
- *Relative Connections:* Only the connections relating to the currently selected tile or tiles appear.
- *All Connections:* All tiles show their connections.
- *Basic, Standard, and Advanced Connections:* Control how much connection detail to show. These three levels match a similar setting in the Connections tab. See Sources and Source Details for more information.

To configure the Graphical tab's connections view

1 Open the Graphical tab's Settings pop-up menu.

2 Choose to show no connections, relative connections for selected tiles only, or all connections.

3 Choose the level of connections to show (basic, standard, or advanced).

Printing the Graphical Tab's Tile Area

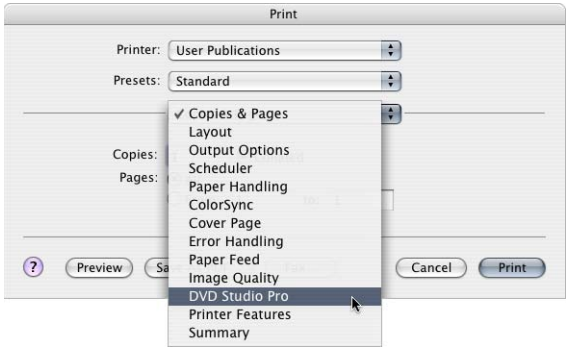
Printing the Graphical tab's tile area can be a useful way to show others the basic construction of a project. The contents of the Graphical tab print as they currently appear with respect to tile size and placement and connection view status.

You can choose to print the whole tile area on a single sheet of paper or to print the tile area over multiple sheets of paper.

To print the Graphical tab's tile area

1 Choose File > Print Graphical View (or press Command-P).

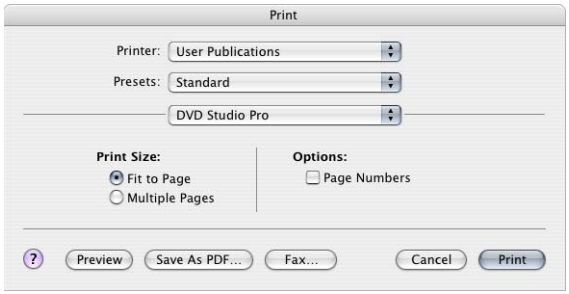
2 Choose DVD Studio Pro from the print configuration pop-up menu.



3 Select one of the following:

- *Fit to Page:* Prints the entire tile area on one sheet.

- *Multiple Pages:* Prints the tile area at full size, using as many sheets of paper as necessary.



4 Select the Page Numbers option to add page numbers to each sheet. This is especially useful when you select Multiple Pages.

5 Click Preview to see an example of how the printed document will look, or Print to print the tile area.

Managing Elements Using the Outline and Graphical Tabs

You can use either the Outline or Graphical tab to manage your project's elements.

Renaming Project Elements

In addition to entering an element's name in its Inspector, you can rename an element in the Outline or Graphical tab.

To rename an element in the Outline tab

1 Select the element whose name you want to change.

2 Click the element's name.

3 Type the new name, then press Return.

The element's name is changed.

To rename an element in the Graphical tab

1 Double-click the element's name.

2 Type the new name, then press Return.

The element's name is changed.

Deleting Elements

You can delete elements to remove them from your project.

To delete an element or group of elements

1 Select the element or group of elements to delete.

2 Do one of the following:

- Choose Edit > Delete (or press the Delete key).
- Control-click in an empty area of the Outline or Graphical tab, then choose Delete from the shortcut menu.

Important: If you delete a track that has stories, the stories are also deleted. An alert appears to warn you of this.

Duplicating Elements

You can duplicate elements within the Outline and Graphical tabs. You can build a chapter index menu, for example, and quickly make duplicates of it that just need to have their connections changed to become functional.

To duplicate an element

1 Select the element to duplicate.

You can also select multiple elements.

2 Do one of the following:

- Choose Edit > Duplicate (or press Command-D).
- If you have selected a single element, Control-click the element, then choose Duplicate from the shortcut menu.
- If you have selected a group of elements, Control-click in an empty area of the tab, then choose Duplicate from the shortcut menu.

The new element is named with its type (menu, track, and so on) followed by the next number. For example, if you duplicate a menu when there are already five menus, the new one becomes "Menu 6." In the Outline tab, the new element appears last in the section.

Assigning the First Play Element

In addition to using the Disc Inspector or the Connections tab, you can assign your project's First Play element directly in the Outline or Graphical tab. The First Play element is the one that plays when a DVD player begins playing the project.

To assign the First Play element in the Outline tab

Do one of the following:

- Control-click the disc element, choose First Play from the shortcut menu, then choose the First Play element from the submenu. This method allows you to select a specific button (menu), slide (slideshow), or chapter marker (track or story) within an element to play from.

- Control-click an element, then choose First Play from the shortcut menu. This method uses the element's default button (menu), first slide (slideshow), or first marker (track or story) to play from.

To assign the First Play element in the Graphical tab
Do one of the following:

- Control-click in an empty area of the Graphical tab, choose First Play from the shortcut menu, then choose the First Play element from the submenu. This method allows you to select a specific button (menu), slide (slideshow), or chapter marker (track or story) within an element to play from.
- Control-click a tile, then choose First Play from the shortcut menu. This method uses the element's default button (menu), first slide (slideshow), or first marker (track or story) to play from.

See Setting the Project's First Play for more information.

Simulating Elements

The Simulator provides a way to verify your project before you build the title. Starting the Simulator by clicking Simulate in the toolbar simulates the project from its beginning, at the element designated as "First Play." However, often you will want to start the Simulator at a specific project element, for example, to verify the navigation of a chapter index menu.

You can use the Outline or Graphical tab to start the Simulator at a specific element so that you can quickly verify it is working as planned.

To start the Simulator at a specific element
Do one of the following:

- Choose File > Simulate Element, where "Element" is the type of element currently selected.
- In the Outline or Graphical tab, Control-click the element at which you want to start the Simulator, then choose Simulate from the shortcut menu.
- Select the element to start the Simulator with, then press Command-Option-0 (zero).

Note: Clicking Simulate in the toolbar always starts the Simulator with the element assigned as first play. If no first play element has been assigned, the Simulator starts by playing the first track.

Using Item Descriptions

An item description is an XML text file that lists all the properties of an element. You can save and load an item description, and view the description using TextEdit. You can also load an item description from one project into another. This can make it easy to create menus in multiple projects that all look the same or to copy a script between projects.

To save an item description

1 Select the element for which you want to save a description.

You can select the element in the Outline or Graphical tab or in any of the editors.

Note: You cannot export an item description of a story. Item descriptions of tracks include their stories.

2 Choose File > Export > Item Description.

3 Enter a name for the file and select its destination in the dialog that appears, then click Export.

DVD Studio Pro creates the file and saves it in the location you specified.

To load an item description

1 Choose File > Import > Item Description.

2 Locate the description file to load and click Import in the dialog that appears.

Important: Item descriptions from previous versions of DVD Studio Pro cannot be loaded into DVD Studio Pro 4. An alternative is to open a project in DVD Studio Pro 4 that contains the element you originally made the item description from, then save a new item description from it.

With the exception of script item descriptions, you cannot import item descriptions created in one DVD standard (SD DVD or HD DVD) into the other DVD standard. Additionally, you cannot import item descriptions from one video standard (NTSC or PAL) into another video standard.

The description file loads and a new element appears in the Outline and Graphical tabs. The description file uses the same name it had when it was saved, unless that name is already in use. If the name already exists, a number is added to the end of its name, or if a number already exists, the number increments to form a unique name.

Note: When you load an item description into a project, all of the assets used when the description was saved must still be available. An error message appears if any problems are encountered.

Importing and Managing Assets

11

DVD Studio Pro provides tools and workflow options that give you the flexibility to decide how best to import and manage your assets.

This chapter covers the following:

- How DVD Studio Pro Manages Assets (p. 195)
- About the Assets Tab (p. 201)
- Importing Assets (p. 207)
- Removing Selected Assets (p. 213)
- Renaming Assets (p. 213)
- Refreshing Still and QuickTime Assets (p. 214)
- Opening Assets in Their Editor (p. 216)
- Identifying an Asset (p. 216)
- Previewing Assets (p. 216)
- Asset Inspector (p. 218)

How DVD Studio Pro Manages Assets

As you work on your DVD project, it's important to give some thought as to how best to organize and manage your assets. Even a simple project can use enough assets to make it worth investing the time to plan for them. Moderately ambitious projects can use hundreds of assets, creating a large potential for confusion as you try to keep track of them.

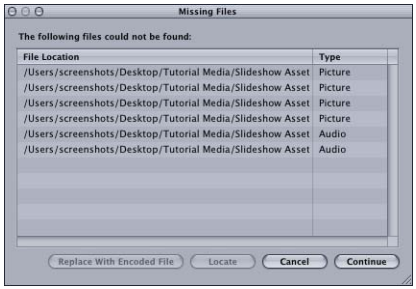
Additionally, if you intend to author both SD and HD versions of your project, keeping the assets organized is crucial to avoid confusing an SD version of a video asset with an HD version of it.

There are several methods you can use to import an asset into a project, but in all cases the assets are treated the same.

Importing an asset into a DVD project does not actually copy or move the asset file from its current location. The Assets tab simply lists references to the actual asset files. The folder structure you create in the Assets tab does not affect the folder structure of the files on your hard disk; it only helps you manage the asset names while working on your project.

Missing or Renamed Assets

Once you import an asset into a project, it's important not to move or rename its source file. A Missing Files window appears if you open a project and DVD Studio Pro cannot locate an asset in its original location. You can manually locate the asset or cancel the dialog.



To locate a missing asset when opening a project

1. Select the asset in the Missing Files window.
2. Do one of the following:
   - Click Locate and use the file location dialog to find the asset.
   - If the asset is a QuickTime file and its MPEG-2 or AIFF encoded version is available, you can click "Replace with encoded file." In these cases, the QuickTime version of the asset is not required, and instead its encoded versions are used by the project. See Should You Remove the Original QuickTime Files? for more information.

If you open the project without locating the assets, or the assets become missing while the project is open, the names of the missing assets are displayed in red and any elements in which the assets are used are disabled.

To reconnect an asset to a project

Do one of the following:

- Choose File > Asset > Re-Link.
- In the Assets tab, Control-click the asset's name, then choose Relink from the shortcut menu.

You can only relink assets whose names appear in red.

Any elements that use missing assets are displayed in red in the Outline and Graphical tabs. The elements cannot be opened, either from the Outline tab, the Graphical tab, or in their editor. If you select an element with missing assets, a dialog appears with three choices:

- *Relink:* The Missing Files window opens so that you can locate the missing files.
- *Delete Clips/Slides/Assets:* The missing assets are removed from the element.
  - *For tracks:* Any clips with missing assets are removed.
  - *For menus:* Any item with a missing asset is set to "not set" as its asset (no items are removed—only their asset assignment is changed).
  - *For slideshows:* Any missing slides are removed from the slideshow.
- *Continue:* The element shows as being selected in the Outline and Graphical tabs, but it is not opened in its editor. This provides the opportunity to delete the element, which removes it from the project.

Using Video and Audio Assets That Are Not DVD-Compliant

When you import motion assets (video or audio) that are not DVD-compliant into a DVD Studio Pro project, the integrated MPEG encoder converts them to be DVD-compliant (if they are in a supported format). In addition to the general MPEG encoding settings, the Encoding pane in DVD Studio Pro Preferences includes a setting that controls whether the encoding begins immediately as a background function or waits until you build the final project into the VIDEO_TS folder.

There is also a preferences setting in the Destinations pane to control where the encoded files are saved. See Destinations Preferences for more information.

To set the Encoding preferences

1. Choose DVD Studio Pro > Preferences.
2. Click the Encoding icon to open the Encoding pane.
3. Set the encoding method by selecting one of the following:
   - *Background encoding:* The encoding begins as soon as you import the asset. The encoding takes place in the background, allowing you to continue working on your project. A progress bar appears in the Status column of the Assets tab. Once the encoding process finishes, the Status column displays Done. See Default Columns in the Assets Tab for more information.
   - *Encode on build:* The encoding does not start until you complete your project and build the VIDEO_TS or HVDVD_TS files.
4. Configure the remaining encoding items as needed. See Using the Integrated MPEG Encoder for more information.
5. Click Apply to enable the settings and OK to close the Preferences window.

The current encoding settings are applied to assets as soon as they are imported, whether you choose to start encoding them right away or wait to encode them when you build your project. Changes you make to the Encoding preferences only affect assets you import from then on. See Verifying and Changing Encoding Settings for more information.

How the Encoded Files Are Named

When you import QuickTime video assets into DVD Studio Pro, the integrated MPEG encoder names the encoded files as follows:

- The first half is the complete original filename, including its extension.
- The second half has three parts—the video standard (NTSC or PAL), the encoding bit rate (shown as a four-digit number), and the ".m2v" extension.

For example, if you import an asset named "Main Program.mov," use the NTSC standard and a bit rate of 5.5 Mbps, the MPEG-encoded filename will be "Main Program.mov_NTSC_5500.m2v."

Audio files created by the embedded AIFF encoder use the original filename with an added ".aiff" extension.

See Using the Integrated MPEG Encoder for more information on the integrated MPEG encoder.

Should You Remove the Original QuickTime Files?

When you import motion assets that are not DVD-compliant, the integrated MPEG and AIFF encoders create the files (video and audio) required by the DVD-Video specification. To free up hard disk space, you may decide to remove the original files.

Even after the encoders have created the new DVD-compliant files, DVD Studio Pro continues to keep track of the original files. The advantage of this is that you can reencode the files if you decide later to use a different bit rate or encoding mode. For example, you might find that, after the initial encoding, the MPEG-2 video looks great but is a larger file than you planned for. You can decide to re-encode using a lower bit rate and use the slower but higher quality two-pass VBR option.

Additionally, if you convert an SD project to an HD project, HD assets imported as QuickTime files can be encoded to HD MPEG-2.

If you decide to remove the original file, DVD Studio Pro notices it is missing and presents you with the Missing Files window. If you then click "Replace with encoded file," the original file will no longer be associated with the project, and DVD Studio Pro will no longer try to find it. See Missing or Renamed Assets for more information. You also will no longer be able to re-encode the asset.

Verifying and Changing Encoding Settings

If your project contains a mixture of 4:3 and 16:9 assets or has some assets you want to encode differently than others, you must be sure to set the Encoding preferences settings before you import the assets. You can verify and change the encoding settings on assets that have been imported.

You can also re-encode a QuickTime asset if you want to try different encoding settings.

To change the encoding settings after importing an asset

1 Do one of the following:

- Select the asset and choose File > Encoder Settings (or press Command-E).
- Control-click the video asset in the Assets tab, then choose Encoder Settings from the shortcut menu.

Note: The Encoder Settings option in the Assets tab shortcut menu is only available if the original QuickTime video file is available.

A dialog appears that contains the same settings found in the Encoding preferences pane.

2 Configure the encoder settings and click OK.

When you have the "Background encoding" method selected in Encoding preferences and you make any changes in this dialog, one of two things happens:

- *If you change the bit rate setting:* The current file, whether a complete or partially complete file, is left as is and the encoder starts encoding a new file. This allows you to compare the quality of the two bit rates. If you decide to continue the encoding of the partially completed file, you can set the bit rate (and any other settings you might have changed) to the value it used, and the encoder will continue encoding it.

  Note: If the encoded files are being written to the project bundle, they are deleted whether or not you change the bit rate setting.

- *If you do not change the bit rate setting:* The original asset is deleted, whether a complete or partially completed file, and a new encoded file is created. For example, if you want to see the difference between one-pass VBR and two-pass VBR encoding and want to keep the files from both encoding sessions, you need to rename or move the completed one-pass VBR encoded file before re-encoding with the two-pass VBR setting.

If you have the "Encode on build" method selected, these changes will apply once you build your project.

Note: Changing the encoding settings for an asset does not affect the encoding settings for other assets.

This method of configuring encoding settings for specific assets allows you to customize how the integrated MPEG encoder gets used in your project. It also makes it possible to have a mixture of assets with different encoding requirements (such as some that use the 4:3 aspect ratio and others that use the 16:9 aspect ratio).

Using Still Assets That Are Not DVD-Compliant

You can add still assets in any format supported by QuickTime to a slideshow or a track. DVD Studio Pro automatically converts them to the MPEG format once you start the build process. It creates an MPEG folder in the location specified in the Destinations pane of DVD Studio Pro Preferences. See Destinations Preferences for details on setting up this preference.

Using DVD-Compliant Assets

When you import supported assets that are DVD-compliant, they are left in their original locations with no processing (other than the parse file being created, as described in the next section).

About the Parse Files

To use an asset in a project, DVD Studio Pro needs to know some general information about it, such as its length, type, and integrity. Video assets encoded within DVD Studio Pro can include this information in the encoded files, or can create separate files for it. Assets encoded by Compressor outside of DVD Studio Pro can include this information if you select the "Add DVD Studio Pro meta-data" option in the Extras pane of the Encoder settings.

Assets encoded with other encoders, or with the "Add DVD Studio Pro meta-data" option deselected when using Compressor, must be parsed before DVD Studio Pro can use them. Parsing creates a small file, with the same name as the video asset and a ".par" extension that contains the required information. The parse file can take from several seconds to several minutes to create, depending on the size of the asset file.

See Destinations Preferences for details on setting up the parse file preference.

About Segmented MPEG Files

The segmented MPEG files created by some third-party encoders do not import correctly into DVD Studio Pro. Some encoders segment their large encoded files into 1 GB files. When imported into DVD Studio Pro, only the first 1 GB segment is imported. You need to append the files into a single file before importing the asset into DVD Studio Pro. There are several third-party applications that can be used to append a segmented MPEG file into a single file.

Using Motion, LiveType, and Soundtrack Pro Projects

DVD Studio Pro allows you to import Motion, LiveType, and Soundtrack Pro projects directly into your DVD project. This has several benefits:

- You do not have to render the projects before importing them. DVD Studio Pro allows you to use them as if you had rendered them and exported a QuickTime movie from them. You import the projects using the same methods you would use to import other assets.

  Note: Playing projects requires significantly more system resources than playing a QuickTime movie. Depending on your system, projects may skip frames or show artifacts when playing as part of a menu or track.

- You can open the Motion, LiveType, or Soundtrack Pro project from DVD Studio Pro. If you make changes to the project in Motion, LiveType, or Soundtrack Pro, DVD Studio Pro automatically uses the updated project.

To open a Motion or LiveType project in that application, from within DVD Studio Pro

Do one of the following:

- Select the project in the Assets tab, then choose File > Asset > Open in Editor.
- Control-click the project in the Assets tab, then choose Open in Editor from the shortcut menu.
- Double-click the project in the Assets tab.

Note: The Motion or LiveType application must be available on your computer.

About the Assets Tab

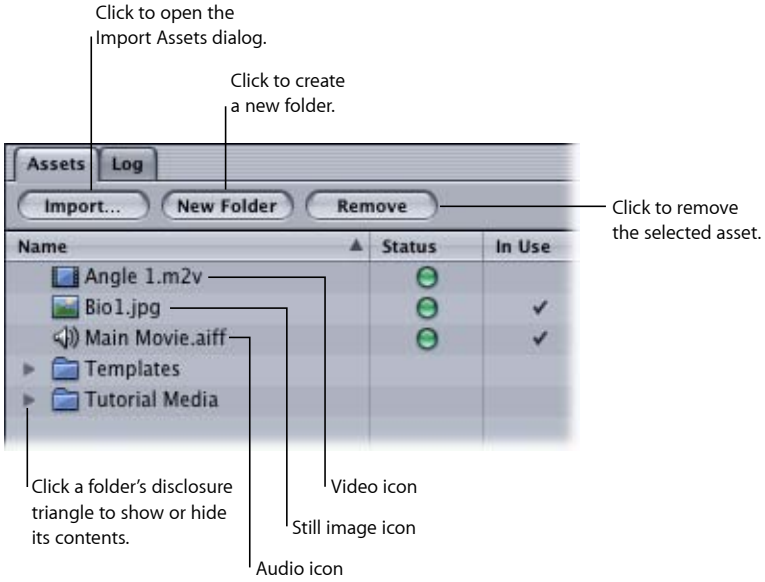
The Assets tab displays a list of all assets imported into the project, whether they were directly imported to the Assets tab or dragged to the Menu or Track Editor from the Palette or a Finder window.

About QuickTime Files

QuickTime files often contain a video and audio stream. When you import a QuickTime file with both video and audio, it is displayed in the Assets tab as two files, each with the same name, one with the video icon and the other with the audio icon. The Type column lists them as QuickTime Video or QuickTime Audio. In most cases, these files are encoded with the integrated MPEG or AIFF encoder. You can re-encode the video files by Control-clicking them, then choosing Encoder Settings from the shortcut menu.

An exception is the HDV and H.264 QuickTime files you can import into HD projects. These QuickTime files do not require encoding with the integrated MPEG encoder and cannot be re-encoded.

Note: Subtitle text files and shapes do not appear in the Assets tab.



The Assets tab can contain up to 15 columns. For information on choosing which columns appear, see Managing Columns in the Assets Tab.

The Assets tab also has three buttons you can use to manage the assets.

- *Import:* Opens the Import Assets dialog so you can choose assets to import. See Using the Import Asset Feature for more information.
- *New Folder:* Creates a new folder in the assets list. If you have an existing folder selected, the new folder becomes its subfolder. See Creating Asset Folders for more information.
- *Remove:* Removes the selected asset or assets, including folders, from the assets list. A message appears if you try to remove assets that are currently in use by the project. This does not affect the asset's actual file—it just controls whether it appears in this list. See Removing Selected Assets for more information.

Default Columns in the Assets Tab

The following columns appear by default in the Assets tab. You can remove these, change their order, and add additional columns as needed. See Managing Columns in the Assets Tab for more information.

- *Name:* Applies to all asset types. Displays the asset's name and an icon that represents the asset type. By default the asset name is the same as the asset filename, but you can rename the asset to make it easier to identify within your project. See Renaming Assets for more information.

The Name column also displays folders, with disclosure triangles, which you can use to organize your assets.

- *Status:* Applies to all asset types. Displays whether the asset is being encoded, parsed, or is ready to use.
  - *Progress bar:* Appears while the asset is encoding or parsing.
  - *Yellow:* The asset has not been encoded (applies to assets to be encoded with the integrated MPEG or AIFF encoder). If the setting in the Encoding pane of DVD Studio Pro Preferences is set to "Encode on build," the yellow dot appears for any assets that will be encoded once you build the project.
  - *Green:* The asset has been encoded (applies to assets encoded with the integrated MPEG or AIFF encoder only).
  - *Red:* The asset encountered an error while encoding or parsing.
- *In Use:* Applies to all asset types. Shows a checkmark next to all assets currently in use within the project.
- *Type:* Applies to all asset types. Displays the type of asset (QuickTime video, AC-3 audio, and so on).
- *Length:* Applies to video and audio asset types. Displays the length (in hours:minutes:seconds:frames) of the asset.
- *Size:* Applies to all asset types. Displays the file size of the asset. In the case of QuickTime assets, shows the size of the original QuickTime file. You can select the asset to see its encoded file size in the Asset Inspector.
- *Rate:* Applies to video and audio asset types. For video assets, displays the original frame rate. For audio, displays the original sample rate (typically 48000 or 96000).

Additional Columns You Can Add

You can add the following additional columns to the Assets tab.

- *Location:* Applies to all asset types. Displays the asset's actual filename and location within your system.
- *Timestamp:* Applies to video and audio asset types. Displays the timecode value of the first frame.
- *Channels:* Applies to audio assets. Displays the number of audio channels contained in the file.
- *Dimensions:* Applies to video and still assets. Displays the size of the image in pixels (before rescaling, if applicable).
- *Layers:* Applies to still assets. Displays the number of layers the still contains.
- *Bit Depth:* Applies to still assets. Displays the number of bits the still contains.

- *Aspect:* Applies to video and still assets. For video assets, displays the aspect ratio of the asset (4:3 or 16:9). For still assets, shows whether the asset is being rescaled to fit the video aspect ratio (Retain) or is displaying actual pixels (blank).
- *Markers:* Applies to video assets. Displays the number of chapter markers the video contains.

Managing Columns in the Assets Tab

DVD Studio Pro lets you customize the columns in the Assets tab, making it easy to display only the information you want.

To display a hidden column

- Control-click the column name to the left of where you want the hidden one to appear, then choose the column's name from the shortcut menu.

  All columns that are currently displayed have checkmarks next to their names.

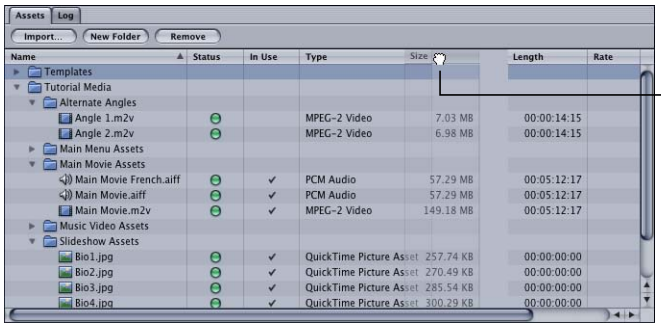
To hide a column

- Control-click in the column name area, then choose the column's name from the shortcut menu.

  You can choose to display as few or as many of the columns as you like.

To change the order of the columns

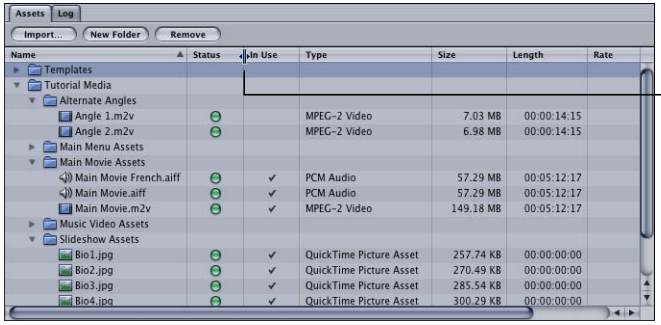
- Drag a column's name to a new position.



When you drag a column to a new position, the other columns shift to make room for the one you are moving.

To change a column's width

- Position the pointer on its right edge. When the pointer changes to a double arrow, drag to the new size.



The pointer changes to a double arrow when you change a column's width.

Managing the Contents of the Assets Tab

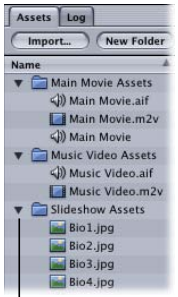
As you add assets to your project, you will want to keep them organized to reduce the potential for confusion. There are several tools you can use to organize and keep track of your assets:

- *Folders:* Folders are the most powerful organizing tool for managing your assets. For added flexibility, you can create subfolders (folders within folders), import assets directly into a folder, and move assets between folders. You can also drag a folder to a new location.
- *Sorting:* You can sort the assets based on any of the columns.
- *Asset information:* You can select any asset to see its properties in the Asset Inspector.

Creating Asset Folders

You can create folders in the Assets tab at any time—before or after you have imported your assets.

Important: Folders in the Assets tab help you organize your assets in your project. They do not affect the actual media files on your hard disk.



Click the disclosure triangle to open and close folders.

To create and name a folder

1 Do one of the following:

- Choose Project > New Asset Folder (or press Command-Shift-N).
- Control-click anywhere within the Assets tab, then choose Create New Folder from the shortcut menu.
- Click the New Folder button in the Assets tab.

2 Select the folder, click the folder's name, then type a new name.

To create a new folder within an existing folder

- Control-click the existing folder, then choose Create New Folder from the shortcut menu.

Sorting Assets

You can sort the assets in the Assets tab by any of the columns.

To sort the assets

1 Click the name of the column by which you want to sort the assets.

The assets sort in the order of that column's contents, and a triangle appears next to the column's name to indicate it is controlling the sort and to show the sort's direction (up or down).

The triangle indicates the column controlling the sort and the sort direction (up or down).

2 Click the name of the column a second time to change the sort's direction.

Scrolling Through the Assets List

Once you have added a number of assets to your project, DVD Studio Pro provides a variety of methods for scrolling through them.

To scroll through a list of assets

Do one of the following:

- Drag the scroller located on the right edge of the Assets tab. Hold down the Option key to scroll slowly through the list (useful with long lists).
- Press the Up Arrow and Down Arrow keys to scroll through one asset at a time.
- Press Option–Up Arrow to jump to the first asset in the list.
- Press Option–Down Arrow to jump to the last asset in the list.
- Press the Page Up and Page Down keys or hold down the Option key while clicking the scroller's arrows to scroll through the list one page at a time.

Importing Assets

DVD Studio Pro provides several methods for importing assets into a project.

- *Using the Import Asset feature:* You can click the Import Asset icon in the toolbar, click the Import button in the Assets tab, or use a shortcut menu in the Assets tab to import assets directly into the Assets tab.
- *Dragging assets to the Assets tab:* You can drag assets from the media tabs in the Palette or a Finder window to the Assets tab.
- *Dragging assets directly to project elements:* You can drag assets directly to the Menu Editor, Track Editor, and several other elements in your DVD Studio Pro project. These assets are also automatically added to the Assets tab.

See Media Tabs for information on using the Audio, Stills, and Video tabs in the Palette.

Note: To help organize your assets, it's a good idea to create folders in the Assets tab before you import your assets, although you can create folders and move assets into them at any time.

Importing Assets That Are Not DVD-Compliant

When you import video and audio assets that are not DVD-compliant, DVD Studio Pro uses its integrated MPEG encoder to convert them. In DVD Studio Pro Preferences, you can specify whether the encoding happens immediately, in the background, or waits until you build your completed project. See Using Video and Audio Assets That Are Not DVD-Compliant for more information.

Once the encoding starts, a progress bar appears in the Status column of the Assets tab.

Using the Import Asset Feature

You can import assets directly from within the Assets tab by using the Import button or by using the Import Asset icon in the toolbar. You can import single assets, multiple assets, or entire folders of assets.

Note: The "Find matching audio when dragging" setting in the Track pane of DVD Studio Pro Preferences does not apply when you use the Import Asset dialog. Only the files you select are imported into the Assets tab.

To import assets from within the Assets tab

1. Select the folder in the Assets tab that you want to import the assets into (if applicable).
2. Open the Import Asset dialog by doing one of the following:
   - Choose File > Import > Asset (or press Command-Shift-I).
   - Control-click the folder or an empty area of the Assets tab, then choose Import from the shortcut menu.
   - Click the Import button in the Assets tab.
   - Click Import Asset in the toolbar.
   - Double-click an empty area of the Assets tab.
3. Locate the assets or folder to be imported, then click Open.

The assets are imported into the Assets tab. If you select a folder, the folder and all recognized asset files in it are added to the Assets tab. Any subfolders within the imported folder are also imported. A message appears if the folder contains assets that are not supported by DVD Studio Pro.

Note: An asset cannot be imported more than once, and it can only appear once in the Assets tab. However, any asset in the Assets tab can be used multiple times in a project.

Dragging Assets to the Assets Tab

You can drag one or more assets from the Palette or a Finder window to the Assets tab and place them directly in folders if desired.

To import assets from the Palette or a Finder window

1. In the Palette or a Finder window, select the assets to be imported.
2. Do one of the following:
   - *To import them at the root level of the Assets tab:* Drag the assets to an empty area of the tab.
   - *To import them into a folder in the Assets tab:* Drag the assets directly to the folder.

If you select a folder in the Finder window and drag it to the Assets tab, the folder and all recognized asset files in it are added to the Assets tab. Any subfolders within the imported folder are also imported. A message appears if the folder contains assets that are not supported by DVD Studio Pro.

The Track pane of DVD Studio Pro Preferences includes a "Find matching audio when dragging" setting. When this checkbox is selected and you drag a video asset or group of video assets, DVD Studio Pro automatically looks for audio assets with the same base name in the same folder, and imports them as well. This does not happen if you drag a mixture of asset types, such as video and still images. It also does not happen when you use the Import Asset dialog. You can temporarily override the preferences setting by holding down the Command key after you start dragging video assets.

About Dragging Assets Directly to a Project Element

You can drag an asset from the Assets tab, the Palette, or a Finder window directly to the element that is going to use it. Assets dragged from the Palette or a Finder window are also added to the Assets tab. See Dragging Assets to the Menu Editor, Dragging Assets to the Track Editor, Dragging Assets to the Slideshow Editor, and Dragging Assets to the Outline and Graphical Tabs for more information.

As is the case when you drag video assets to the Assets tab, the "Find matching audio when dragging" setting in the Track pane of DVD Studio Pro Preferences controls whether audio assets automatically follow the video assets when they are dragged to an element.

Dragging Assets to the Menu Editor

You can drag video, audio, and still images to the Menu Editor. You can drag multiple assets, but they must all be of the same type (video or still image). You can drag a folder that contains still images to create a slideshow.

- *If you drag the asset to the Menu Editor and drop it immediately:* It uses the default action for that asset type.
- *If you drag the asset to the Menu Editor and pause:* The context-sensitive Drop Palette appears so that you can choose the asset's action. The choices available depend on the type of asset you are dragging and whether you are dragging it to an empty part of the Menu Editor, a button, or a drop zone. See Options in the Drop Palette for Standard Menus and Options in the Drop Palette for Layered Menus for a complete list of the actions available.
- *If you drag video assets to the Menu Editor:* DVD Studio Pro automatically looks for audio assets with the same base name in the same folder and imports them as well. This does not happen if you drag a mixture of asset types, such as video and still images.

You can also drag templates and styles from the Palette. Any assets used by the template or style, such as a background video or an asset assigned to a drop zone, are also added to the list in the Assets tab, in a folder named Templates. See Using Templates, Styles, and Shapes to Create Your Menus for more information on using templates and styles.

Dragging Assets to the Track Editor

You can drag video, audio, and still images to streams in the Track Editor. You can drag multiple assets, but you cannot drag a folder. See Adding Video and Audio Assets for details on how the assets are placed in their streams.

You can also drag one or more still images, as well as a folder containing multiple still images, to a subtitle stream. Each still image creates a subtitle clip. See Importing a Graphics File for more information.

Dragging Assets to the Slideshow Editor

You can drag one or more still images, as well as a folder, to the Slideshow Editor. The still images are automatically added to the slideshow. See Creating Slideshows for more information on slideshows.

Dragging Assets to the Outline and Graphical Tabs

You can drag video, audio, and still images to the Outline and Graphical tabs. How the assets are used depends on where you drag the assets. The only difference between dragging to the Outline or Graphical tab is that only the Outline tab has section titles for each element type. The following tables list the supported actions.

Note: Most of the following actions work with the Outline tab's By Type and By VTS displays. The exceptions are dragging assets to the Tracks and Slideshows sections, because the By VTS display does not have these sections. Additionally, with the By VTS display, all menus created by dragging assets to the Menu section of a VTS are automatically assigned to that VTS. See Showing the VTS Editor for more information on the By VTS display.

The following table lists the actions when you drag assets to an empty area or the disc's name.

Assets	Action
One video asset	Creates a track and adds the video to stream V1.
Multiple video assets	Creates a track for each and adds the video to stream V1.
One audio asset	Creates a track and adds the audio to stream A1.
Multiple audio assets	Creates a track for each and adds the audio to stream A1.
One video/audio asset pair	Creates a track and adds the video to stream V1 and the audio to stream A1.
One still image	Creates a menu and sets the still image as its background.

Assets	Action
Multiple still images	Creates a slideshow and adds the still images to it.
One multiple-layer PSD file	Creates a standard menu and sets the file as the background with all layers selected.
One folder	Creates a slideshow and adds the still images to it.

The following table lists the actions when you drag assets to the Menus section title in the Outline tab.

Assets	Action
One video asset	Creates a menu and sets the video as its background.
Multiple video assets	Creates multiple menus and sets the video as their backgrounds.
One audio asset	Creates a menu and assigns the audio to it.
One video/audio asset pair	Creates a menu and sets the video as its background and assigns the audio to it.
One still image	Creates a menu and sets the still image as its background.
Multiple still images	Creates multiple menus and sets the still images as their backgrounds.
One multiple-layer PSD file	Creates a standard menu and sets the file as the background with all layers selected.

The following table lists the actions when you drag assets to a specific standard menu.

Assets	Action
One video asset	Sets the video as the menu's background.
One audio asset	Assigns the audio to the menu.
Multiple audio assets	Assigns the audio to the menu.
One video/audio asset pair	Sets the video as the menu's background and assigns the audio to it.
One still image	Sets the still image as the menu's background.
One multiple-layer PSD file	Sets the file as the menu's background with all layers selected.

The following table lists the actions when you drag assets to a specific layered menu.

Assets	Action
One still image	Sets the still image as the menu's background.
One multiple-layer PSD file	Sets the file as the menu's background with all layers selected.

The following table lists the actions when you drag assets to the Tracks section title in the Outline tab.

Assets	Action
One video asset	Creates a track and adds the video to stream V1.
Multiple video assets	Creates a track for each video asset and adds the video to stream V1 on each track.
One audio asset	Creates a track and adds the audio to stream A1.
One video/audio asset pair	Creates a track and adds the video to stream V1 and the audio to stream A1.
One still image	Creates a track and adds the still image to stream V1.
Multiple still images	Creates a track and adds the still images to stream V1.
One multiple-layer PSD file	Creates a track and adds the still image to stream V1, using only the layers set as visible in Photoshop.

The following table lists the actions when you drag assets to a specific track.

Assets	Action
One video asset	Adds the video to stream V1, at the end of any existing video.
Multiple video assets	Adds the videos to stream V1, at the end of any existing video.
One audio asset	Adds the audio to stream A1, at the end of any existing audio.
Multiple audio assets	Adds the audios to stream A1, at the end of any existing audio.
One video/audio asset pair	Adds the video and audio to streams V1 and A1, at the end of any existing video and audio.
One still image	Adds the still image to stream V1, at the end of any existing video.
Multiple still images	Adds the still images to stream V1, at the end of any existing video.
One multiple-layer PSD file	Adds the still image to stream V1, at the end of any existing video, using only the layers set as visible in Photoshop.

The following table lists the actions when you drag assets to the Slideshow section title in the Outline tab.

Assets	Action
One audio asset	Creates a slideshow and assigns this as its overall audio.
One still image	Creates a slideshow and adds the still image to it.
Multiple still images	Creates a slideshow and adds the still images to it.
One multiple-layer PSD file	Creates a slideshow and adds the still image to it, using only the layers set as visible in Photoshop.
One folder of images	Creates a slideshow and adds the still images to it.

The following table lists the actions when you drag assets to a specific slideshow.

Assets	Action
One still image	Adds the still image at the end of the slideshow.

Assets	Action
Multiple still images	Adds the still images at the end of the slideshow.
One multiple-layer PSD file	Adds the still image at the end of the slideshow, using only the layers set as visible in Photoshop.
One folder of images	Adds the still images at the end of the slideshow.

Removing Selected Assets

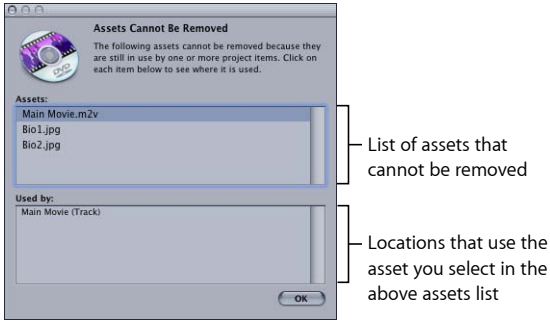
If you no longer need assets in a project, you can remove them from the Assets tab.

Important: The Assets tab only contains links to the actual asset files. Removing an asset from the Assets tab does not actually delete the asset's file from your hard disk.

To remove assets from the Assets tab

1. Select one or more assets to remove.
2. Do one of the following:
   - Choose Edit > Remove Asset (or press Delete).
   - Control-click in the Assets tab, then choose Remove from the shortcut menu.
   - Click the Remove button in the Assets tab.

You cannot remove assets that are currently in use by the project. If you try to do so, an error message appears listing the selected assets that are in use and which project element is using them.



You can click an asset in the list to see which elements use it, or use the Up Arrow and Down Arrow keys to scroll through the assets list.

Renaming Assets

You can rename assets as they appear in DVD Studio Pro. This does not affect the actual name of the asset's file.

To rename an asset

1. Select the asset in the Assets tab.
2. Change its name by doing one of the following:
   - Click the asset's name after the asset has been selected and type a new name.
   - Enter a new name in the Asset Inspector's Name field.

See Asset Inspector for more information on the Asset Inspector.

Refreshing Still and QuickTime Assets

It is possible, during the course of creating your project, that you will need to update a still or QuickTime asset. DVD Studio Pro includes both an automatic and a manual asset refresh capability to make it easier to use updated versions of your still and QuickTime assets.

Important: An alert appears when updated assets have been detected, and the Encode view of the Log tab lists specific elements that use those assets. It is important to verify that each of these elements function correctly.

All still and QuickTime assets are automatically refreshed any time you bring DVD Studio Pro to the foreground on your computer. For example, if you are working in DVD Studio Pro and switch to a graphics program to update a still or QuickTime asset used in the current project, the asset refreshes as soon as you switch back to DVD Studio Pro.

Important: If the Simulator is active when assets are refreshed, you must close it and restart it for the refreshed assets to appear correctly in it.

You can also manually refresh selected assets.

To manually refresh selected assets

Do one of the following:

- Choose File > Asset > Refresh.
- Control-click the asset to be refreshed in the Assets tab, then choose Refresh from the shortcut menu.

Manually refreshing still and QuickTime assets is useful when you are updating them using a networked computer.

Note: You cannot refresh MPEG motion assets.

Issues with Refreshing Still Assets

When used in slideshows and as clips in tracks, still assets that have been refreshed will have no impact outside of the change you made to the still asset itself.

When used in a menu, there may be issues for you to work with. For example, if the asset is used in a menu also using overlays, you may have to readjust the button active areas to match any changes you have made to the graphic. The same is true if you have made changes to the layers of a multiple-layer PSD file.

Issues with Refreshing QuickTime Assets

Changes made to QuickTime assets, which can include video, audio, or both together, can have large impacts on any project elements that use them.

Re-encoding

Any QuickTime assets you make changes to that have already been MPEG encoded by the DVD Studio Pro integrated MPEG encoder will need to be re-encoded. If you have enabled background encoding in the Encoding pane of DVD Studio Pro Preferences, this re-encoding will start automatically.

Video Asset Length Changes

If you have changed the length of a video asset that is used in a track, there could be audio sync problems if other assets are used in the same track. For example, making the asset shorter would cause all video assets in the timeline that are placed after it to shift earlier because the V1 stream cannot have any gaps in it. The corresponding audio does not shift though, because audio streams can have gaps.

Making the QuickTime video asset longer does not change the clip in any tracks that use it. You have to manually change the clip's duration in the tracks to use the added video.

When used as backgrounds in motion menus, you may need to adjust the menu's duration to better fit with the asset's new length.

Video Asset Content Changes

If you have changed the content of a video asset, you may need to adjust marker positions to match the new content or, in the case of motion menus, adjust the loop point.

Audio Asset Length Changes

If you have changed the length of an audio asset that is used in a slideshow, there are several issues that may arise.

- *If the audio is assigned to a specific slide:* That slide's length will change.
- *If the audio is assigned to the slideshow as overall audio and Fit to Audio has been selected:* The slideshow's duration will change.

In both cases, if you have shortened the audio asset it is possible that the slide and transition durations cannot be shortened enough to match the audio.

Making the QuickTime audio asset longer does not change the clip in any tracks that use it. You have to manually change the clip's duration in the tracks to use the added audio.

Opening Assets in Their Editor

You can open a selected asset in a different application. This can make it easier for you to update the asset.

Note: See Using Motion, LiveType, and Soundtrack Pro Projects for information on opening Motion and LiveType projects.

To open an asset in a different application

Do one of the following:

- Choose File > Asset > Open In Editor or File > Asset > Open With.
- Control-click the asset to be opened in the Assets tab, then choose Open In Editor or Open With from the shortcut menu.

Open In Editor and Open With have the following differences:

- *Open In Editor:* Choose this if you want to open the asset using its registered application (exactly as would happen if you double-clicked the asset in the Finder).
- *Open With:* Choose this if you want to select the application to open the asset. This is useful when the registered application for that asset type is not the application you want to use.

With still assets, you can edit and save them using the selected application, and DVD Studio Pro automatically refreshes the assets.

With audio and video motion assets, you may find that you are unable to resave the assets once you have edited them. To ensure you can resave the audio or video motion assets, close the DVD Studio Pro project once you have opened the asset in its application.

Identifying an Asset

You can identify an asset's actual filename and location and even open a Finder window that displays it. This is especially useful if you have renamed the assets within DVD Studio Pro.

To identify an asset's filename and location

Do one of the following:

- Control-click the asset's name, then choose Reveal In Finder from the shortcut menu. This opens a Finder window displaying the asset's file.
- Add the Location column to the Assets tab. This column lists the details of the asset's file.

Previewing Assets

You can display an asset in the Viewer tab or listen to its audio.

To preview an asset

1 Select the asset in the Assets tab.

2 Preview the asset by doing one of the following:

- Choose File > Asset > Preview (or press the Space bar).
- Control-click the asset, then choose Preview from the shortcut menu.
- Double-click the asset.

You can use the controls in the Viewer tab to pause and stop playback.

QuickTime video assets preview in their native format, even if they have been encoded with the integrated MPEG encoder. To preview the MPEG-encoded version of the QuickTime asset, you must add the asset to a track and preview it from the Track Editor.

The Settings pop-up menu contains several settings that control what you see in the Viewer tab.

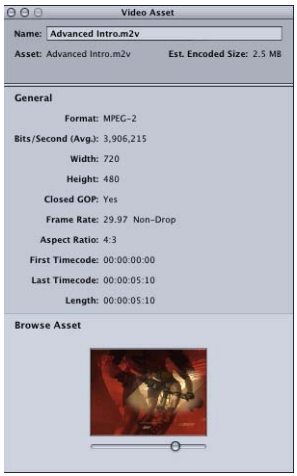
- *Title Safe Area and Action Safe Area:* These settings turn on a shaded area around the outside edge of the menu, indicating portions of the menu that may not be viewable on most consumer monitors. Placing buttons or text in these shaded areas can be risky and should be avoided. There are two safe areas: title and action. The title safe area is more constricted and should be observed for items that must be seen by the viewer. All text and buttons should be within this area. The action safe area is closer to the menu edges and is considered a boundary for items that you would like the viewer to see but that are not required. You can also press Command-E to show or hide the title safe area and Command-Option-E to show or hide the action safe area.

- *Square Pixels and Rectangular Pixels:* You can choose to switch between viewing assets with square pixels or scaled to the video aspect ratio (either 4:3 or 16:9). See Understanding Pixel Differences in Graphics and Video for more information. You can also press P to toggle the pixel display type.
- *Show Single Field:* This setting optimizes playback when using field-based video sources. This is especially important with video that has fast motion because it will reduce the motion artifacts. However, selecting Show Single Field with frame-based video sources results in reduced resolution (edges may appear jagged). This setting only affects how the assets appear in the Viewer and does not change the actual assets themselves.

Note: Anamorphic still assets will preview as 4:3 assets.

Asset Inspector

When you select an asset in the Assets tab, the Asset Inspector appears.



The Asset Inspector shows general information about the selected asset. The only information you can edit is the asset's name as it appears in DVD Studio Pro.

Video assets include a thumbnail image and a scrubber so you can scrub through the video. Still assets also include a thumbnail image.

Introduction to Creating Menus

12

Menus are the backbone of your project. To ensure a positive experience for the viewer, it's important to create menus that provide logical navigation and a consistent experience.

This chapter covers the following:

- About Menus (p. 219)
- About the Menu Editor (p. 224)
- Starting and Working with a Menu (p. 231)

About Menus

Menus provide the buttons that the person viewing a DVD uses to configure the disc's playback and to choose the tracks and slideshows that supply the DVD's content. DVD menus are made up of a background, which can be a still image or a full-motion movie, and buttons. For the most part, the elements that make up a menu are created outside of DVD Studio Pro. You use DVD Studio Pro to combine these elements into a complete menu and assign actions to the buttons. See Preparing Menu Assets for details on creating the graphics used in your menus.

DVD Studio Pro includes templates and styles that can make it easier to create menus. You can use the supplied templates and styles to quickly create your menus, or you can create your own templates and styles. Using templates and styles lets you apply a standardized look to your menus for all of your projects—for example, to maintain a corporate image. See Using Templates, Styles, and Shapes to Create Your Menus for more information.

Before you create your menus, you need to understand the two different methods used to create menus in DVD Studio Pro, and be aware of special considerations for menus with a 16:9 aspect ratio. If you are authoring HD projects, you also need to be aware of special issues when creating HD menus.

In DVD Studio Pro, you can create menus using either a standard, or *overlay* method, or a *layered* method. You can use menus created with both methods in a project, so you can use the method best suited to each individual menu.

The menu creation methods differ primarily in how each button's states are displayed. Each button in a menu has three states:

- *Normal:* How the button looks when not in the selected or activated state
- *Selected:* How the button looks when you navigate to it using the DVD player's arrow buttons
- *Activated:* How the button looks after you navigate to it and press Enter. This state is typically displayed for just a short time before the menu clears and the next element appears, based on the action assigned to the button.

Standard Menu Creation Method

The standard method uses an overlay structure to display each button's states. As described in detail in Creating Overlays, an overlay is a four-color image used to identify the highlight area of each button. Each of the four colors is mapped to the actual color and transparency values that appear for each of the three button states.

The standard method provides the most flexibility when creating menus.

- The background can be static, or it can be a full-motion video clip.
- The background can contain the normal state of the buttons, or it can be plain, with the overlay supplying the normal button image.
- You can use DVD Studio Pro to type text over the menu. The text can be used to title the menu or just provide basic information.
- You can add text to buttons or even create text-only buttons.
- You can use *shapes* on the menu as either buttons or drop zones. Shapes are self-contained graphics that include the normal state image, a graphic that defines the highlight area, and that can even display a full-motion thumbnail image of an assigned asset. Some shapes, called *patches*, contain animated effects. Shapes can be fully positioned and resized. DVD Studio Pro includes many stock shapes and can import shapes you create. The stock shapes are particularly useful when you are creating menus with minimal reliance on graphics programs.
- You can create *drop zones* on the menu. A drop zone is an area of the menu you can assign an asset or shape to. You can reposition, resize, and rotate drop zones. Drop zones become a part of the menu's background when you build the project. They allow you to add graphic elements to your menu that are not text- or button-related, making it possible to create complex menu backgrounds.
- You can use templates and styles.
- You can add audio to the menu.

The drawback of the standard method is that using overlays limits your creativity when showing the different states of a button. While the normal state of a button can be a full 24-bit image, you can only use up to four colors (as defined by the DVD-Video specification) to modify the normal image to show the selected and activated states. Because one of these colors is typically used as a transparent background color, that leaves only three colors. This is sufficient to add an outline or highlight to show when the button is selected or activated, but it is not enough to allow you to radically alter the button.

See Creating Menus Using the Standard Method for details on creating standard menus.

Layered Menu Creation Method

The layered method allows you to create independent 24-bit versions of each button for each of the three states (normal, selected, and activated). This gives you great flexibility in changing a button's appearance when it is selected and activated.

The layered method requires an Adobe Photoshop (PSD) graphics file that contains a separate layer for each state of each button, in addition to the background graphic. This means a menu with 12 buttons requires 36 layers to show the normal, selected, and activated states of each button. You can combine overlays with buttons created using the layered method.

There are several drawbacks to using the layered method:

- You cannot have motion in the background; backgrounds must be still images.
- You cannot use the text or shape features.
- You cannot use templates and styles.
- You cannot add audio to the menu.
- Viewers may experience a slow reaction time while navigating around the buttons on DVD players.

Because layered menus use separate layers for each button state, DVD Studio Pro performs some behind-the-scenes processing, creating separate hidden menus for each possible state of the menu. In the above example with 12 buttons, 25 versions of the menu would need to be created (one with all buttons in their normal state, and one for each button in its selected and activated states). These menus are not visible as separate elements within your project, but are displayed when you use the arrow buttons on the DVD player's remote control to navigate to a button and activate it.

Due to the number of menus that are created using the layered method, some DVD players may have a slight delay in displaying the menus as viewers navigate around the buttons, which may confuse impatient viewers.

See Creating Menus Using the Layered Method for details on creating layered menus.

Working with 16:9 Menus

When using 16:9 menus in your project, you need to be aware of several things.

How the Menu Will Be Displayed on a 4:3 Monitor

Be sure to choose the proper display mode in the Menu tab of the Menu Inspector. Also, a default Display Mode setting in DVD Studio Pro Preferences sets all new menus, tracks, and slideshows to the proper display mode.

The options include 4:3, 16:9 Pan-Scan, 16:9 Letterbox, and 16:9 Pan-Scan & Letterbox. If you select Pan-Scan, be aware that areas at the left and right edges of the menu will not be visible. See Choosing an Aspect Ratio for more information on this and other aspect ratio issues.

Fewer Buttons Can Be Used

When you set a menu's display mode to 16:9 Pan-Scan or 16:9 Letterbox, you reduce the total number of buttons you can have on the menu. For SD projects, the total number of buttons drops from 36 to 18; for HD projects, the total drops from 48 to 24. This is because DVD Studio Pro must create two menu overlays, one for each aspect ratio, and automatically select the one to use based on the DVD player's aspect ratio setting. When you set a menu's display mode to 16:9 Pan-Scan & Letterbox, the total number of buttons you can have on a menu drops to 12 for SD projects, and 16 for HD projects, because three menu overlays must be created.

16:9 Graphics Must Be Anamorphic in SD Projects

All graphics for 16:9 menus in SD projects must be anamorphic (horizontally compressed to fit the 4:3 aspect ratio). See What Exactly Is a 16:9 Asset? for details on creating graphics for 16:9 menus.

Creating Menus for HD Projects

Creating menus for HD projects is not much different from creating menus for SD projects. The most common issue is understanding how the HD-based DVD menus handle background video assets with respect to their resolutions.

There is a Resolution setting in the General pane of DVD Studio Pro Preferences that defines the default resolution of all new menus (and tracks and slideshows) you create. However, the actual resolution of a menu is usually defined by the background video asset you assign to it.

For example, if your default resolution as defined by the preferences setting is 1280 x 720p and you create a new menu, its resolution is 1280 x 720p. If you set the menu's background video to a 1920 x 1080i asset, the menu's resolution automatically changes to match it.

If you set a menu's background asset to something that is non-standard, for example, a still that is 800 x 600, the menu's resolution changes to the highest resolution that is smaller than the non-standard size (in this example, full D1, which is 720 x 480 for NTSC or 720 x 576 for PAL), and the image is scaled to fit. If you set a menu's background to something that is smaller than full D1, it is scaled up to the full D1 size.

Note: As with SD-based DVD menus, when a menu's background asset does not match the 4:3 or 16:9 display mode, the empty areas are filled with the menu background color, as defined in the Menu pane of DVD Studio Pro Preferences.

You must also be aware that the limit on the number of buttons your menu can have is different than with SD-based DVD menus. Menus using the 4:3 aspect ratio can have up to 48 buttons. Menus using the 16:9 Pan-Scan or 16:9 Letterbox modes can have up to 24 buttons. Menus using the 6:9 Pan-Scan & Letterbox modes can have up to 16 buttons.

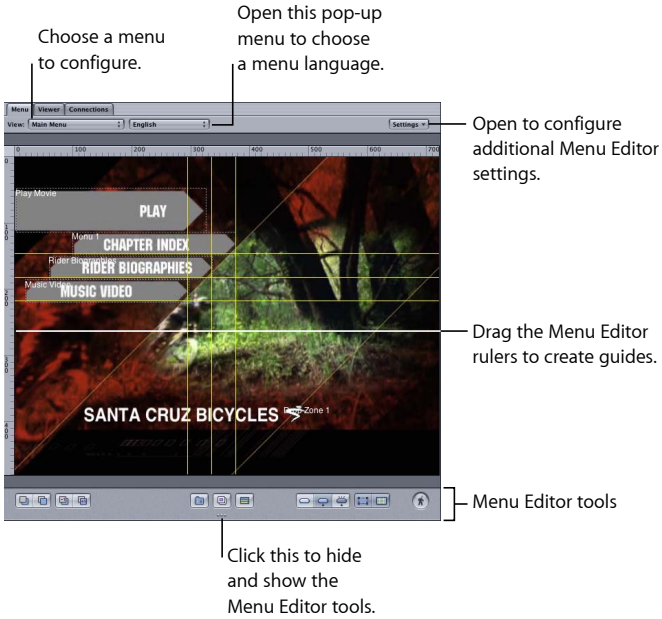
Adding Intro and Transition Clips to Menus

You can make the DVD viewing experience more polished by adding short video clips that play at the beginning of a menu (*intro* clips) and when buttons are pressed (*transition* clips).

There are several approaches you can take to add these clips to your project. See Adding Intro and Transition Clips to Menus for more information.

About the Menu Editor

The Menu Editor is contained in the Menu tab. It displays the menu graphics in either a 4:3 or 16:9 aspect ratio (depending on what is set in the Menu tab in the Menu Inspector). There are also several buttons and pop-up menus that let you select what appears in the editor and provide tools that help with the menu creation process.



The Menu Editor scales the menu to fit within its quadrant. As you make the quadrant larger, the menu also increases up to the point that it reaches full size, when it stops growing and the extra area around it is filled with gray. When working with the larger HD resolutions, however, you may find it difficult to increase the quadrant's size enough to show the menu at full size. One option is to tear off the Menu tab into its own window, which you can then resize without affecting the rest of the DVD Studio Pro interface. See Tearing Off a Tab into Its Own Window for more information.

Using the Menu Rulers

The left and top sides of the Menu Editor can display rulers. When you click within the Menu Editor, marks on the ruler show the pointer's position. The Alignment pane in DVD Studio Pro Preferences contains configuration settings for the ruler. These settings include whether the rulers are shown and the units they use (pixels, percentage, and so on). See Alignment Preferences for details on setting the ruler's preferences.

To show or hide the menu rulers

Do one of the following:

- Select the relevant setting in the Alignment pane of DVD Studio Pro Preferences.

- Press Command-R.

Using Menu Guides

You can create horizontal and vertical guides to assist you while creating your menu. The guides are useful when lining up buttons or text on a menu. You can create as many guides as you need, reposition them, and remove them. The guides include a snapping feature that makes it easy to position menu items.

The Alignment pane in DVD Studio Pro Preferences contains configuration settings for the guides. These settings include whether the guides are shown and their color. See Alignment Preferences for details on setting the guide's preferences.

To create a guide

- Place the pointer over the top or left ruler, then drag into the Menu Editor.

Note: The rulers must be visible before you can add guides to the Menu Editor.

To reposition a guide

- Drag the guide where you want it.

To hide or show previously created guides

Do one of the following:

- Click the Guides button on the Menu Editor.

Shows and hides the menu guides.

- Press Command-Semicolon (;).

To temporarily disable snapping to the guides while moving an item

- Press Command while dragging the item. This also disables the dynamic guides discussed in the next section, Using Dynamic Guides.

To remove a guide

- Drag the guide back to the ruler.

Note: Like button outlines, guides are not included when you build your project, so it is not necessary for you to remove them when you are done.

Using Dynamic Guides

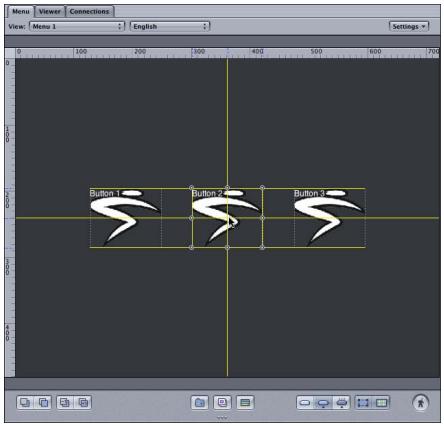
In addition to the menu guides, there are also dynamic guides that automatically appear as you drag menu objects. Dynamic guides make it easy to align menu objects with each other and with the menu's center. As you move a menu object around, lines appear and the object snaps into position whenever one of its edges or its center is in alignment with another object's edge or center or the menu's center.

This tool is especially useful when you are creating duplicates of an existing button (by Option-dragging it) and want them all to line up with each other.

Only the guide preference's color setting applies to dynamic guides—they do not disappear when you hide the menu guides.

To temporarily hide the dynamic guides and disable their snapping action

- Hold down the Command key while you drag the menu object.



Using the Align Objects Feature

The align objects feature allows you to select a group of objects and apply an alignment mode to them. For example, you could select three buttons and set them so that their left edges align.

The usual way of dragging to select a group of items will not work—you will end up creating a new button.

To select multiple menu items

Do one of the following:

- To individually select items, hold down the Shift key and click them.
- To select a group of items by dragging, press the Command key while dragging over them.
- To select all items in the Menu Editor, press Command-A.

- To deselect all items, press Command-Shift-A.

Once you have the objects selected, you can align them.

To use the align objects feature

1. Select the group of objects to align.

   Note: The last object you select is the reference object that the others align to.

2. Do one of the following:

   - Choose Arrange > Align Objects, then choose the alignment to use (Top, Center, Bottom, Left, Middle, or Right).
   - Control-click one of the selected objects, then choose the alignment to use (Top, Center, Bottom, Left, Middle, or Right) from Align Objects in the shortcut menu.

The objects move to the new alignment. If you get a surprising result, press Command-Z to undo the alignment and verify that you had the right buttons selected and that you selected the reference button last.

Using the Distribute Objects Feature

The distribute objects feature allows you to select a group of objects and evenly space them between each other.

To use the distribute objects feature

1. Select the group of objects to distribute. See Using the Align Objects Feature for details on how to do this.

   Note: The order that you select the objects does not matter. The objects are distributed between the two outermost objects.

2. Do one of the following:

   - Choose Arrange > Distribute Objects, then choose the distribution method to use (Horizontally or Vertically).
   - Control-click one of the selected objects, then choose the distribution method to use (Horizontally or Vertically) from Distribute Objects in the shortcut menu.

Menu Editor Pop-Up Menus and Tools

The Menu Editor tools let you customize the editor to your needs.

To show or hide the Menu Editor tools

- Click the dots at the bottom of the Menu Editor.

Menu Editor Pop-Up Menus

The top of the Menu Editor contains several pop-up menus.

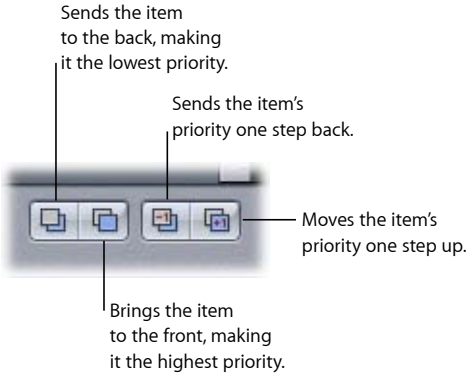
- *View:* Choose the menu you want to open in the Menu Editor from this pop-up menu. This is an alternative to selecting the menu in the Outline or Graphical tab.

- *Language selection:* Choose a language to configure for this menu from the pop-up menu next to the View pop-up menu. See Using Languages with Menus for more information.
- *Settings:* Contains a variety of settings that control what you see in the Menu Editor.
  - *Auto Assign Buttons Now and Auto Assign Buttons Continuously:* You can choose to have DVD Studio Pro automatically assign button navigation settings to the current menu configuration or continuously. See Configuring Button Navigation for more information.
  - *Display Background, Display Overlay, and Display Composite:* You can choose to show the background or overlay by itself or as a composite image. You can also press Q to step through these options.
  - *Title Safe Area and Action Safe Area:* These settings turn on a shaded area around the outside edge of the menu, indicating portions of the menu that may not be viewable on most consumer monitors. Placing buttons or text in these shaded areas can be risky and should be avoided. There are two safe areas: title and action. The title safe area is more constricted, and should be the boundary for items that must be seen by the viewer. All text and buttons should be within this area. The action safe area is closer to the menu edges, and is considered a boundary for items that you would like the viewer to see but are not required. You can also press Command-E to show or hide the title safe area, and Command-Option-E to show or hide the action safe area.
  - *Square Pixels and Rectangle Pixels:* You can choose to switch between viewing the menu images with square pixels or scaled to the video aspect ratio (either 4:3 or 16:9). See Understanding Pixel Differences in Graphics and Video for more information. You can also press P to toggle the pixel display type.
  - *Show Single Field:* Optimizes playback when using field-based video sources. This is especially important with video that has fast motion, because it reduces the motion artifacts. However, selecting Show Single Field with frame-based video sources results in reduced resolution (edges may appear jagged).

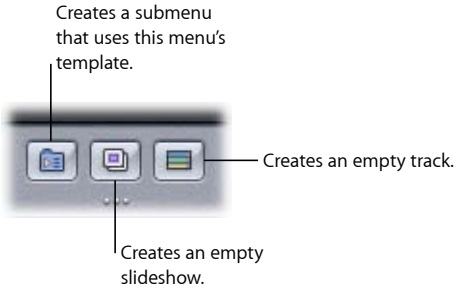
Menu Editor Tools

The lower part of the Menu Editor contains a variety of buttons.

- *Arrange controls:* These buttons allow you to change the priority of the selected item, letting you control which items have a higher priority by bringing them forward, or by sending lower-priority items to the back. See About Button Numbers for more information.

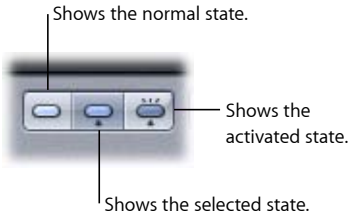


- *Add Submenu, Add Slideshow, and Add Track buttons:* These buttons allow you to create a new element in your project and add a button to the current menu that connects to them. You can also press Command-Option-Y to create a submenu, Command-Option-K to create a slideshow, and Command-Option-T to create a new track.

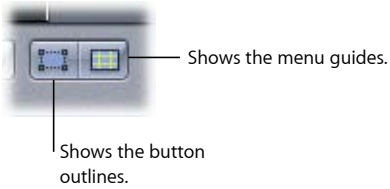


The new button added to the menu uses the menu's default button style. See Setting Default Styles for more information.

- *Button state selections:* These buttons allow you to see the selected button in any of the three states (normal, selected, or activated). You can also press W to step through these options.



- *Button Outlines button:* You can turn on button outlines, which show each button's active area box and the button name. When your menu has buttons without an asset or shape assigned, turning off button outlines can make them disappear, which can be confusing if you later forget they are there and add them again.
- *Guides button:* You can show or hide the menu guides created when you drag from the rulers into the Menu Editor. This does not affect the dynamic guides that appear when you drag items in the menu. See Using Menu Guides for more information. See Alignment Preferences for details on setting the menu guide preferences. You can also press Command-Semicolon (;) to show or hide these guides.



- *Motion button:* Applies to standard menus only. Use this button to start or stop playback of video and audio assets assigned to the menu. This is useful for motion menus and still menus that include audio, providing a preview of how the motion elements appear. You can also press the Space bar or Command-J to turn the motion on and off.

Note: The Motion button in DVD Studio Pro does not work the same way as the similar button in iDVD. In DVD Studio Pro, the Motion button does not have to be active to create a motion menu. It does not affect how the menu will appear when you finish the project and build the title.

Starting and Working with a Menu

By default, all projects have an empty standard menu for you to start with. You can also add additional menus as needed.

Creating a New Menu

The following describes how to add a new standard or layered menu to your project.

To add a standard menu

Do one of the following:

- Choose Project > Add to Project > Menu (or press Command-Y).
- Control-click in the Outline or Graphical tab, choose Add from the shortcut menu, then choose Menu from the submenu.
- Click Add Menu in the toolbar.

A new standard menu is added to the project, with the name "Menu _," where "_" is the number of that menu. You can rename menus, making it easier to locate specific ones.

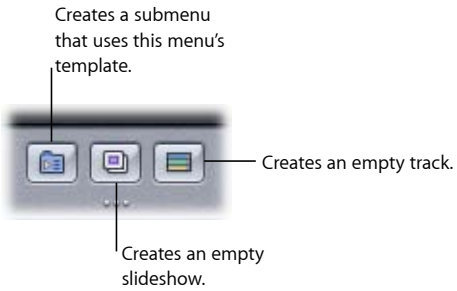
To add a layered menu

Do one of the following:

- Choose Project > Add to Project > Layered Menu (or press Command-Shift-Y).
- Control-click in the Outline or Graphical tab, choose Add from the shortcut menu, then choose Layered Menu from the submenu.
- Click Add Layered Menu in the toolbar.

A new layered menu is added to the project, with the name "Menu _," where "_" is the number of that menu. You can rename menus, making it easier to locate specific ones.

You can also create a new standard submenu from an existing menu (standard or layered) by clicking the Add Submenu button in the Menu Editor.



This creates a new menu based on the original menu, using its background, buttons, and other settings. This also adds a new button to the existing menu that is linked to the new submenu.

Opening a Menu

To work with a menu, you need to open the Menu Editor for that menu. You can do so from the Outline tab, the Graphical tab, or within the Menu Editor.

To open a menu from the Outline tab

1. Click the Outline tab.
2. Click the disclosure triangle next to Menus to display a list of current menus (if they are not already visible).
3. Select a menu by clicking its name.

   The menu appears in the Menu Editor, and the Inspector switches to show the menu's settings. If the Menu Editor is not visible, you can double-click the menu's name in the Outline tab to make it appear.

To open a menu from the Graphical tab

1. Click the Graphical tab.
2. Select a menu by clicking its tile.

   The menu appears in the Menu Editor, and the Inspector switches to show the menu's settings. If the Menu Editor is not visible, you can double-click the menu's tile in the Graphical tab to make it appear.

To choose a menu in the Menu Editor

- Choose the menu to open from the View pop-up menu, located along the top of the Menu Editor.

  The menu appears in the Menu Editor, and the Inspector switches to show the menu's settings.

Naming a Menu

As you add menus to your project, you should rename them to make it easier to locate and group them.

To rename a menu

Do one of the following:

- In the Outline tab, select the menu, click its name, then type the new name.
- In the Graphical tab, select the menu tile, double-click its name, then type the new name.
- Select the menu in the Outline tab, the Graphical tab, or the Menu Editor, then enter the new name in the Name field of the Menu Inspector.

Adding Assets to a Menu

There are several ways to add assets to a menu:

- Drag an asset to the Menu Editor. See Dragging Assets to the Menu Editor for details.

- Apply a template or style from the Palette. See Applying a Template or Style for details.
- Select the assets in the Menu Inspector. See Creating Menus Using the Standard Method or Creating Menus Using the Layered Method for details.

Dragging Assets to the Menu Editor

One way to add an asset to a menu is to drag the asset to the Menu Editor, and then use the Drop Palette to assign the asset a function. You can drag the asset from the Assets tab, the Palette, or from the Finder. You can also drag tracks, menus, and slideshows from the Outline or Graphical tab. When you drag an asset, the Drop Palette appears after a short delay to let you choose what function the asset will serve. For example, if you drag a still graphic, the menu may offer the options of using it as a background, an overlay, or a button.

The top item in the Drop Palette is the default function. If you drag an asset or element to the Menu Editor and release it before the Drop Palette appears, the default function is applied.

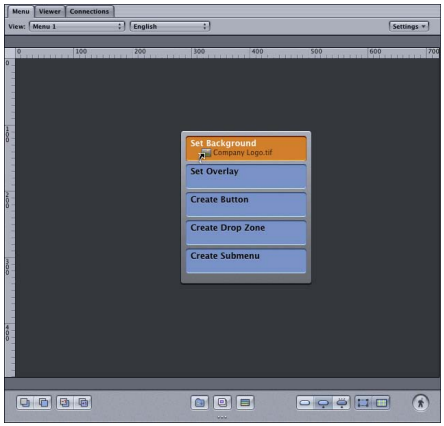
Viewing the Drop Palette

The Drop Palette appears when you drag items to the Menu Editor.

To see the Drop Palette

- Drag the asset to the Menu Editor. When it's positioned exactly where you want it, hold the asset there while you keep the mouse button pressed.

The Menu pane of DVD Studio Pro Preferences contains a setting that controls the length of the delay before the Drop Palette appears. See Menu Preferences for more information.



The options in the Drop Palette depend on the type of asset you are dragging, whether you drag it to a button or an empty area of the menu, and the type of menu (standard or layered). For example, if you drag a video asset to an existing button, the Drop Palette provides the options of linking the video to the button and creating a track for it. If you drag the same asset to an empty part of the menu, the Drop Palette contains options for either using the video as the background, or adding a button at that location and linking it to the video.

- *If you drag an asset and you don't see the options you expect in the Drop Palette:* You may not have dragged it to the right place. Continue holding down the mouse button and drag the asset to the correct location.
- *If you drag to the menu but do not wait for the Drop Palette to appear:* A default action is applied.
- *If you select an option that creates a new button on the menu:* That button will use the default button style assigned to that menu. This style can determine whether or not the new button shows a thumbnail image of the asset.
- *If you are dragging multiple assets or elements and will be creating multiple buttons:* The new buttons will be stacked together. To avoid problems with having overlapping buttons on a menu, be sure to drag them away from each other after they have been created.

See Options in the Drop Palette for Standard Menus and Options in the Drop Palette for Layered Menus for a complete list of Drop Palette options and details on what they do.

About Dragging Video and Audio Assets Together

Several of the Drop Palette options only appear when you select and drag a video/audio asset pair. A video/audio asset pair is created when you select a video asset, and then hold down the Command key and select a companion audio asset. (There are also other ways to select an asset pair, depending on where you are dragging from.)

Having Audio Automatically Follow the Video

If you drag a motion video asset by itself to the Menu Editor and choose an option from the Drop Palette that supports audio, DVD Studio Pro checks to see if there is an audio asset in the same folder with the same basic name as the video asset. If the option does support audio (such as creating a track or setting a menu's background), and an audio file is not already assigned to the target element, DVD Studio Pro can automatically add the audio asset to the element, depending on the "Find matching audio when dragging" setting in the Track pane of DVD Studio Pro Preferences.

Note: You can override the "Find matching audio when dragging" preferences setting by pressing the Command key after you start dragging the video asset.

If you drag a QuickTime movie, from a Finder window or the Video tab in the Palette, that contains both video and audio to the Menu Editor, it is treated as if it were a video/audio pair, with both the video and audio being added to the element.

Selecting Multiple Menu Items

As you create your menus, there will be times when you need to select multiple menu items, such as buttons, drop zones, or text objects, so that they can all be moved, deleted, or have an attribute applied. The usual way of dragging to select a group of items will not work—you will end up creating a new button.

To select multiple menu items

Do one of the following:

- To individually select items, hold down the Shift key and click them.
- To select a group of items by dragging, press the Command key while dragging over them. Any currently selected items are deselected first. Press the Command-Shift keys while dragging to keep any currently selected items selected.
- To select all items in the Menu Editor, press Command-A.
- To deselect all items, press Command-Shift-A.

Copying Menu Items

You are able to copy menu items, such as buttons, drop zones, and text objects, within an existing menu or from one menu to another. You can even copy multiple items at once. See Selecting Multiple Menu Items for more information.

The copied items retain all attributes of their original, including assigned assets and, in the case of buttons, their target settings. The new items have a higher priority than the original items. See About Button Numbers for information on how you can modify the item priorities.

There are several issues that can cause a copy operation to fail.

- You are not allowed to copy items that are incompatible with their destination (such as copying a drop zone to a layered menu).
- You are not allowed to copy buttons to a menu that would cause it to exceed the maximum allowed number of buttons. Menus with a 4:3 aspect ratio can have a maximum of 36 buttons. Menus with a 16:9 aspect ratio can have a maximum of 18 buttons.

Copying Items by Dragging

You can copy one or more items within a menu by selecting them and then dragging them to a new location.

To copy one or more items within a menu by dragging

1. Select the items to be copied.

2 Press the Option key, then drag the items to their new position.

If multiple items are selected, they all move as a group, maintaining their relationships to each other.

Using Copy, Cut, and Paste

You can use the Copy and Paste commands to copy items within a menu and between menus.

To copy one or more items using the Copy and Paste commands

1 Select the items to be copied.

2 Choose Edit > Copy (or press Command-C).

This copies the selected items to the Clipboard. The selected items are not affected.

3 Select the menu where you want to paste the copied items.

4 Choose Edit > Paste (or press Command-V).

If no items are selected in the menu before you paste the copied items, the copied items are placed in the same locations as the originals. If an item is selected in the menu before you paste the copied items, the copied items are positioned relative to the selected item with a small offset.

You can use the Paste command multiple times after using the Copy command. This makes it easy to add a button to multiple menus.

To move one or more menu items using cut and paste

1 Select the items to be moved.

2 Choose Edit > Cut (or press Command-X).

This copies the items to the Clipboard and removes the items from the current menu.

3 Select the menu where you want to paste the cut items.

4 Choose Edit > Paste (or press Command-V).

This is most useful when you are moving menu items from one menu to another.

Moving and Resizing Menu Items

There are a number of methods you can use to move or resize your buttons, drop zones, and text objects in your menu.

To move the item by dragging

- Click inside the dashed lines and drag it to the new position.

To move the item by dragging in one direction only (horizontal or vertical)

- Press the Shift key, then drag the item.

To move the item by dragging with snapping and the dynamic guides temporarily disabled

- Press Command, then drag the item.

To move the item using the arrow keys

Do one of the following:

- Select the item and press the arrow keys to move it one pixel at a time.
- Press Shift and the arrow keys to move it 10 pixels at a time.
- Press Shift-Option and the arrow keys to move it 20 pixels at a time.

To move a button or drop zone

- Use the Coordinates & Size area in the Advanced tab in the Button Inspector or in the Drop Zone Inspector to precisely set a button's or drop zone's size and position.

To move an item's edge

- Click the resize handle at the center of the edge and drag it to the new position. This changes the item's size.

To move an item's corner (which moves two edges at once)

- Click the resize handle at the corner and drag it to the new position. This also changes the item's size.

To change a button's or drop zone's size while maintaining the button's aspect ratio

- Shift-drag an edge or corner.

  See Working with Assets in Buttons and Drop Zones for more information.

To change a button's or drop zone's size while keeping the button centered at its current location

- Click an edge or corner, start dragging, then press the Option key.

To delete an item

- Select it (resize handles appear on its dashed line), then press the Delete key.

Verifying Your Menus

As you create your menus, you will want to verify several aspects of them:

- *Button connections:* Do the buttons connect to the correct project elements?
- *Button navigation:* As you navigate around the menu's buttons using the arrow keys, does the button selection follow a logical path?
- *Menu aspect ratios and languages:* Does the menu perform correctly with different displays and DVD player languages?

Verifying Button Connections

Each button's Target setting (set in the Button Inspector) states its connection. Sometimes, however, the names of the various project elements can make it easy to choose a target that is not the one intended. For this reason, it's important to verify the connections are correct. There are two ways you can do this:

- *Double-clicking the button in the Menu Editor:* If you double-click a button that is connected to a different menu, the Menu Editor automatically switches to show that menu. If you double-click a button connected to a track, story, or slideshow, the appropriate editor opens to that element and the Viewer prepares to play it (all you need to do is click its play button).
- *Simulating the menu:* You can simulate the menu by either Control-clicking in the Menu Editor, then choosing Simulate from the shortcut menu, or Control-clicking the menu in the Outline or Graphical tab, then choosing Simulate from the shortcut menu. This forces the Simulator to start at this menu instead of the First Play connection, as it does when started from the toolbar.

Verifying Button Navigation

To verify button navigation, you need to use the Simulator. Either Control-click in the Menu Editor, then choose Simulate from the shortcut menu, or Control-click the menu in the Outline or Graphical tab, then choose Simulate from the shortcut menu. You can now use the Simulator's arrow keys to verify the navigation and highlight settings.

Verifying Menu Aspect Ratios and Languages

When you create menus using the 16:9 aspect ratio or multiple languages, you can use the Simulator to verify the menu configurations. In DVD Studio Pro Preferences, you can configure the Simulator to mimic a 16:9, 4:3 letterbox, or 4:3 pan-scan display. You can also configure the default language settings of the Simulator.

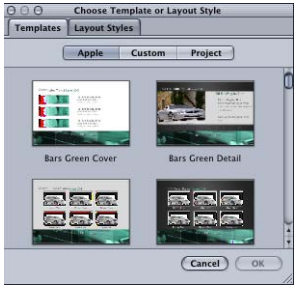
Once you have configured the Simulator preferences, Control-click the menu's name in the Outline or Graphical tab, then choose Simulate from the shortcut menu.

About Chapter Index Menus

When you drag a video asset, track, or slideshow to the Menu Editor, you are given the option of creating a *chapter index menu*. A chapter index menu is created automatically and has buttons linked to the asset's and track's markers or the slides in a slideshow. How the chapter index menu is created depends on the menu already in the Menu Editor:

- *If the menu does not contain any buttons, text objects, or drop zones:* That menu becomes the first chapter index menu (with additional chapter index menus added if more buttons are needed).
- *If the menu contains one or more buttons (whether you drag to them or not):* A new menu is created to become the first chapter index menu (with additional chapter index menus added if more buttons are needed).

When you create a chapter index menu, a Choose Template or Layout Style dialog appears. You use this dialog to select a template or layout style to provide the template for what the menu will look like.



The template or layout style you select defines:

- How many buttons are on a menu
- Where the buttons are placed
- What shape the buttons use
- The navigation between the buttons
- Whether the marker names are used as button text
- Whether the marker's video is used as a button asset

Templates can also define the menu background, assign an audio asset to the menu, and add text objects, such as a title.

If there are more markers or slides than buttons on the template or layout style you select, additional chapter index menus are created.

Templates and layout styles can also include buttons that do not get markers assigned to them. These are special-purpose buttons that you can use to provide navigation between the chapter index menu and other menus in your project.

Once the chapter index menu (or menus) are created, you need to configure the navigation between each of them and the other menus in your project. For example, you would need to provide a way to access the main menu from each chapter index menu, as well as access to the chapter index menus from the main menu. DVD Studio Pro can automatically configure the navigation if you use the correct special-purpose buttons. See Applying Templates or Layout Styles to a Menu with Buttons for information on how button attributes affect the creation of chapter index menus.

Additionally, you can modify any aspect of the chapter index menu that the template or layout style you chose defined. For example, you can move the buttons around, change their shapes, and add additional ones.

DVD Studio Pro includes several templates and layout styles you can choose from, and you can also create some of your own. See Using Templates, Styles, and Shapes to Create Your Menus to learn more about templates and styles.

About the First Marker Button in a Chapter Index Menu

DVD Studio Pro automatically adds the first marker to all tracks. It is named "Start" when the track is created by dragging a video asset to the Menu Editor. (When the asset is dragged to the Track Editor, the name is based on the marker naming settings in the Track pane of DVD Studio Pro Preferences.) When you create a chapter index menu, the first button linked to a marker is linked to the "Start" marker set by DVD Studio Pro.

Because this marker is at the start of the track, pressing this button plays the track from its beginning. If the marker names appear on your chapter index menu's buttons, you may want to edit this button's text to better describe its function.

Creating Menus Using the Standard Method

13

Standard menus provide the most flexibility when you create menus. You can choose to use static or full-motion backgrounds, audio, text objects, and drop zones.

This chapter covers the following:

- About Standard Menus (p. 242)
- Choosing the Menu's Background (p. 243)
- Choosing the Menu's Overlay (p. 246)
- Understanding Color Mapping (p. 248)
- Configuring the Menu Inspector for Standard Menus (p. 256)
- Adding Buttons to Your Menu (p. 265)
- Configuring Button Navigation (p. 281)
- Adding Drop Zones to Your Menu (p. 285)
- Working with Assets in Buttons and Drop Zones (p. 288)
- Adding Text Objects to a Menu (p. 288)
- Adding Audio to a Menu (p. 291)
- Configuring the Menu's Drop Shadow Settings (p. 292)
- Configuring Motion Menu Settings (p. 293)
- Options in the Drop Palette for Standard Menus (p. 296)
- Drop Palette for Standard Menus—Dragging Assets (p. 296)
- Drop Palette for Standard Menus—Dragging Project Elements (p. 304)
- Drop Palette for Standard Menus—Dragging Templates and Styles (p. 309)

About Standard Menus

When creating a menu using the standard method, you have a wide variety of options:

- *Choosing the background:* You need to assign an asset as the menu background. This can be a still graphic or a full-motion video image. It can contain art and text that represents the buttons, or it can be plain, relying on an overlay, shapes, drop zones, and the Menu Editor's text capability to provide background and button art.
- *Choosing the overlay:* Although an overlay graphic is not required for a menu, you typically use one to provide art for selected and activated button states, and in some cases, for the normal state as well. If you do not choose an overlay, DVD Studio Pro generates a full-screen white frame to be used in its place.
- *Using shapes:* You can use shapes either in place of the overlay, or in conjunction with it.
- *Adding drop zones:* You can add graphic elements to your background by creating drop zones and assigning assets to them.
- *Adding text:* You can type text onto the background. This text can be used to create button labels, add titles to the menu, or provide viewing instructions.
- *Adding drop shadows:* You can configure the menu's drop shadow settings and apply them to the menu's shapes, drop zones, and text.
- *Configuring motion settings:* In addition to the menu's background, you can use motion video in the shapes and drop zones. You choose whether the video loops once it reaches the end.
- *Adding audio:* You can assign one or more audio assets to the menu.

You can also simplify the standard method by using the templates and styles feature and choosing from the provided elements or adding your own. See Using Templates, Styles, and Shapes to Create Your Menus for more information.

About Menu Rendering

Depending on how you create your standard menus, they may have to be rendered into an MPEG-2 video asset when you build your project. The menu must be rendered if it uses any of the following:

- Assets assigned to a button
- Shapes
- Drop zones
- Text objects
- SIF (MPEG-1 or MPEG-2), 1/2 D1, or cropped D1 video

Standard menus that only use a background (whether still or video), an overlay, and one or more audio files do not get rendered.

Whether the menu gets rendered or not can be important for a couple of reasons:

- *The time it takes:* Rendering menus is a process that composites all of the menu elements, one frame at a time, and creates an MPEG-2 file out of these composited frames. Depending on your system and the length of your menus, this can take a significant amount of time to process. See Menu Preferences for more information.
- *Extra processing can affect video:* If your menu background video must be rendered, the extra processing has the potential to change the video a small amount. Anytime you decode compressed video, process it (such as by compositing shapes or text over it), then recompress it, you can expect some subtle changes to the background video. In those cases where you have meticulously encoded your background video before assigning it to a menu, this extra processing could noticeably change the video.

When SD menus are rendered, they are encoded at 7 Mbps using the one-pass VBR method. HD menus are rendered at 21 Mbps using the one-pass VBR method.

Choosing the Menu's Background

The first step in creating a menu is to choose its background. The menu background can be a still image or a video clip.

Still Images for Backgrounds

You can use a wide variety of graphic formats as still backgrounds in DVD Studio Pro. See Using Your Graphics Program for a list of supported formats.

For best quality, be sure your graphic:

- *Matches the menu's resolution and aspect ratio (4:3 or 16:9):* If you are creating 16:9 menus in SD projects, or with the 720 x 480p, 720 x 576p, or 1440 x 1080i HD resolutions in HD projects, be sure the graphic is anamorphic. See Creating Graphics to Use in Menus and Choosing an Aspect Ratio for details.
- *Conforms to the broadcast video color space:* Graphics that look stunning in your graphics program can look very different when viewed on DVD. Most graphics applications let you scale colors to NTSC or PAL color space.

DVD Studio Pro automatically scales the size of the background graphic to fit the frame size if necessary. This can result in the menu's background color being visible along some edges.

Note: The color of an empty menu's background can be set in the Menu pane of DVD Studio Pro Preferences. By default this color is set to dark gray.

Video Clips for Backgrounds

Assigning a video clip as a menu's background creates a *motion menu*. The video can be an animation or live action. Often the video is actually a still background with several small moving images representing scenes you can jump to. See Creating Video for Motion Menus for more information on creating the video.

You can choose what happens when a menu's video clip reaches its end:

- It can simply stop, displaying a still image of the last frame.
- It can loop, jumping from the end back to a point in the video clip that you choose.

It is common for a menu's video clip to have a relatively complicated introduction—perhaps with the buttons flying in and a piece of dialogue providing the audio—and then resolve into a mostly still graphic, with lights flickering or objects moving in a repetitive way. This kind of design makes it easier to create a loop that jumps from the end back to the loop point as smoothly as possible.

See Configuring Motion Menu Settings for more information on setting looping options.

Assigning a Background to a Menu

There are several ways to assign a background to a menu. Use the method that you feel most comfortable with. In all cases, these methods also replace an existing background.

Assigning a Menu Background Using the Inspector

You can assign a menu background using the Inspector. With this method, you can only choose from assets already imported into DVD Studio Pro.

To assign a menu background using the Inspector

1 Select the menu and make sure the Menu Inspector displays the menu properties.

2 Choose a background from the Background pop-up menu.

The selected file appears as the menu background.

Assigning a Menu Background by Dragging

You can assign a background to a menu by dragging the asset from the Assets tab, the Palette, or a Finder window.

To assign a menu background by dragging it to the Menu Editor

1 Select the menu in the Outline or Graphical tab or choose it from the Menu Editor's View pop-up menu to display it in the Menu Editor.

2 Locate the background file you want to use in the Assets tab, Palette, or Finder window.

3 Drag the asset to an empty part of the Menu Editor and pause until the Drop Palette appears.

4 Choose Set Background from the Drop Palette.

The background appears in the Menu Editor.

To assign a menu background by dragging it to the Outline or Graphical tab

1 Select the menu in the Outline or Graphical tab or choose it from the Menu Editor's View pop-up menu to display it in the Menu Editor.

2 Locate the background file you want to use in the Assets tab, Palette, or Finder window.

3 Assign the background file to the menu by dragging it to the menu's name in the Outline tab or the menu's tile in the Graphical tab. A box appears around the name or tile to let you know the menu will receive the background file.

The background appears in the Menu Editor when you release the mouse button.

Choosing a Menu's Background from a Layered Photoshop File

You can choose a layer (or several) from an Adobe Photoshop format (PSD) file to use as the menu background. One PSD file can supply backgrounds and overlays for several menus.

To choose a menu background from a PSD file

1 Either create a new menu or select an existing one.

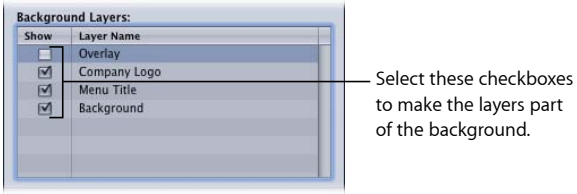
2 Click the Menu tab in the Menu Inspector.

3 Assign the PSD as the menu's background by doing one of the following:

- Choose it from the Background Asset pop-up menu in the Menu Inspector.
- Drag it to the Menu Editor and choose Set Background from the Drop Palette.

The PSD file's layer names appear in the Background area of the General tab.

4 Select the checkboxes next to the layers that make up the background.



Choosing the Menu's Overlay

The second step in creating a menu is to choose its overlay (if you are using one). The overlay is a graphic that defines what kind of highlight appears when the viewer selects each button using the DVD player's remote control, and where each button's highlights occur on the menu. The highlight can be an outline of the button, an underline, or even text.

Note: If you intend to use shapes to create your menu buttons, you do not need to choose an overlay file. You can use an overlay file and shapes in the same menu.

There are two types of overlays you can use when creating your menus:

- *Simple overlay graphics:* These have a single highlight color. Simple overlays use white where they will be transparent, and black to define the highlight areas.
- *Advanced overlay graphics:* These can have up to four colors or shades of gray, depending on the mapping type you intend to use. Using advanced overlays, you have multiple highlight colors appear when selecting or activating buttons.

A single overlay graphic provides the highlights for all buttons. When creating your buttons, you must single out each button's active area to ensure that when the viewer selects a button, only its part of the overlay graphic is highlighted.

The overlay typically provides the art only for each button's selected and activated states. It can also provide the art for the normal state, but this state is most often incorporated into the background, allowing for very nice-looking, 24-bit resolution buttons. An advanced overlay's four-color limit, and especially a simple overlay's one-color limit, greatly restrict the visual quality of normal-state buttons.

The four colors used in an advanced overlay depend on the mapping type used for the overlay:

- *Chroma:* The overlay must use the colors black, red, blue, and white, with white typically being the background color.
- *Grayscale:* The overlay must use the colors black, dark gray, light gray, and white. White is usually used as the background color.

The Mapping Type setting in the Menu Inspector's Colors tab indicates the type of overlay you are using.

If colors other than those specified are present in the overlay, they are mapped to their closest equivalents, which can produce surprising results. Use care to include only the specified colors when creating your overlays. See Creating Overlays for details on creating overlay graphics, including the color values used by the chroma and grayscale mapping types.

It is important to understand that the actual colors used in the overlay, whether you use the chroma or grayscale method, are *not* what appear as the highlights in the menu. They only identify where the actual highlight colors should appear. DVD Studio Pro uses color mapping to set the highlight colors.

See Understanding Color Mapping to learn more about color mapping.

Assigning a Menu Overlay Using the Inspector

You can assign a menu overlay using the Inspector. With this method, you can only choose from assets already imported into DVD Studio Pro.

To assign a menu overlay using the Inspector

1. Select the menu and make sure the Menu Inspector displays the menu properties.
2. Click the General tab in the Menu Inspector (if it's not already visible).
3. Choose an overlay from the Overlay File pop-up menu.

The selected file is assigned as the menu overlay. Depending on other menu settings, you may not see any changes in the Menu Editor.

Assigning a Menu Overlay by Dragging

You can assign an overlay to a menu by dragging it from the Assets tab, the Palette, or a Finder window.

To assign a menu overlay by dragging it to the Menu Editor

1. Select the menu in the Outline or Graphical tab or choose it from the Menu Editor's View pop-up menu to display it in the Menu Editor.
2. Locate the overlay file you want to use in the Assets tab, Palette, or Finder window.
3. Drag the asset to an empty part of the Menu Editor and pause until the Drop Palette appears.
4. Choose Set Overlay from the Drop Palette.

The selected file is assigned as the menu overlay. Depending on other menu settings, you may not see any changes in the Menu Editor.

Choosing a Menu Overlay from a Layered Photoshop File

You can choose a layer from an Adobe Photoshop format (PSD) file to use as the menu overlay. One PSD file can supply backgrounds and overlays for several menus.

To choose a menu overlay from a PSD file

1. Either create a new menu or select an existing one.
2. Click the General tab in the Menu Inspector.
3. Assign the PSD asset as the menu's overlay by doing one of the following:
   - Choose it from the Overlay File pop-up menu in the Menu Inspector.
   - Drag it to the Menu Editor and choose Set Overlay from the Drop Palette.
4. Choose the layer to use as the overlay from the Overlay Layer pop-up menu.

Understanding Color Mapping

Color mapping is the process of assigning highlight colors with transparency values to the colors used in an overlay. The colors you assign can be different for each of the three button states (normal, selected, and activated).

You can use two types of overlays: a simple one that uses a single overlay color and an advanced one that uses up to four overlay colors. For many menus, a simple overlay will provide what you need with minimal complexity. You may find, however, that an advanced overlay provides greater flexibility when you are creating complicated menus.

Differences Between Simple and Advanced Overlays

The simple and advanced overlays differ primarily in how they use the overlay file.

- *For simple overlays:* The color white in the overlay graphic is set to be transparent—this cannot be changed. The only other color allowed is black. If you add a graphic element that has a soft glow or has been anti-aliased, the areas that are not black or white appear with additional highlight colors (controlled by the advanced overlay color mapping settings). You get to choose a highlight color and its transparency for each of the three button states (normal, selected, and advanced). See Creating Simple Overlays for more information.
- *For advanced overlays:* You can use up to four colors when creating your overlay graphic. When setting up the color mapping, you assign a highlight color and transparency to each of the four overlay colors, for each of the three button states. This allows you to create much more varied looks to the menu. For example, you do not need to make all highlight colors for a button the same color. Using an advanced overlay can also allow you to take advantage of anti-aliased edges.

Both simple and advanced overlays use the same color mapping palette and color mapping sets. When you map a color in a simple overlay, you are also mapping the color to the black overlay color in the advanced overlay.

You can use simple overlay mapping for some buttons and advanced overlay mapping for other buttons on the same menu.

Color Mapping Palette

The DVD specification allows a single 16-color palette to be assigned to each menu. This palette provides the colors used by the overlay to create the three button states. You can set each of the 16 colors and save the palette as the default palette for DVD Studio Pro. You can also create a different palette for each menu.

Note: Avoid choosing highly saturated colors. All colors used in your project must conform to broadcast limits. If necessary, the colors are restricted during playback and you may find the colors you configured do not match those used in the title.

Setting the Colors in the Color Palette

You set each of the 16 colors in the palette independently.

To set a palette color

1 Select the menu and make sure the Menu Inspector displays the menu properties.

2 Click the Colors tab in the Menu Inspector.

3 Click Edit Palette at the bottom of the Colors tab.

The Color Palette window appears.

4 Select the color you want to change.

The Colors window appears.

5 Select the color-choosing method you want to use, then choose the color. See Methods for Choosing Colors for information on the different methods.

6 As you choose your color, the color in the palette also changes.

To change another color in the palette, select it in the Color Palette and repeat the above process. Click the close button once you have set the colors in the Color Palette.

In the Colors tab in the Menu Inspector, clicking the Save as Default button makes this set of colors the DVD Studio Pro default palette, and it will be used in all menus and projects created from now on (until it is changed again). Clicking Restore to Default overrides any changes you have made to this palette and sets it to match the default palette.

Note: Although they are identical in how they appear and work, the Color Palette used for subtitles is independent of the one used for menus.

Methods for Choosing Colors

DVD Studio Pro uses the standard Mac OS X Colors window. The window provides a variety of methods for choosing your colors, including a magnifying glass for grabbing colors from anywhere on your system's display. See Mac Help for information on using the Colors window.

Color Mapping Sets

While the DVD specification limits you to 4 colors in a menu overlay and 16 colors in a menu's palette, you can use those colors in different ways on each button on a menu. DVD Studio Pro lets you choose from three color mapping sets for each button.

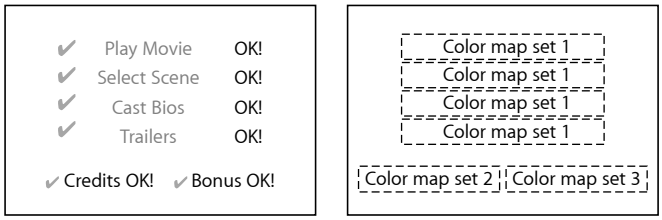
Each set uses the same Color Palette, but allows you to assign different colors and transparencies to each overlay color for the selected and activated states of the buttons. There are two reasons you might want to do this:

- To include buttons with different highlight colors on the same menu
- To get around problems with overlapping buttons

Both the Menu and Button Inspectors have tabs with color mapping settings. The settings you make in the Colors tab in the Menu Inspector affect all buttons that you have created and will create for that menu. All buttons use color mapping set 1 when first created.

Once a button has been created, its properties appear in the Button Inspector. You can select a different color mapping set (2 or 3) for this button in the Style tab. You can also change the color mapping settings (for example, picking a different color for the selected state of overlay color 2) in the Colors tab. However, this affects all buttons that use that setting, not just the current button.

The illustration below shows a menu with six buttons. The menu uses the three color mapping sets to group buttons with similar functions.



Using Simple Overlay Color Mapping

Simple overlays have one color setting for each button state (normal, selected, and activated). All white areas of the overlay graphic are automatically set to be transparent—all black areas become a highlight area. You can use palettes and color mapping sets with a simple overlay.

The following steps show you how to set up color mapping for a menu when using a simple overlay. Once you start creating buttons (described in Adding Buttons to Your Menu), you will be able to select the color mapping sets for them.

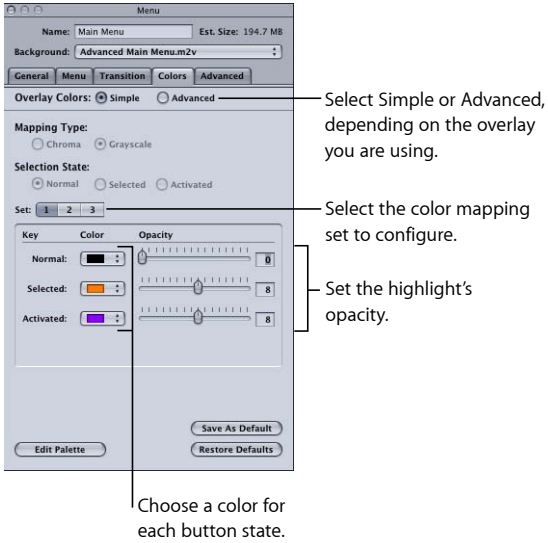
To set up color mapping for a menu using a simple overlay

1. Select a menu that has a background and overlay assigned.

   The Menu Inspector appears.

2. Click the Colors tab in the Menu Inspector.
3. Select Simple next to Overlay Colors.
4. In the Menu Editor, choose Display Composite from the Settings pop-up menu to see the normal color settings take effect as you set them. (You will not see the selected and activated settings take effect until you start creating buttons.)
5. Set the color and opacity settings for the normal selection state.
   - *To choose the color:* Open the Color pop-up menu and choose a color from the 16-color palette that appears.

- *To set the opacity:* Either enter a new value in the fields to the right of the Opacity slider, or drag the sliders. The values range from 0 (completely transparent) to 15 (completely opaque).



Set the normal color settings based on whether the background includes the normal button graphics.

- *If the normal button graphics are included in the background:* Set the opacity for the Normal color to 0 (completely transparent).
- *If the normal graphics are not included in the background:* Set the opacity and select the color so that the buttons appear as intended.

6 Select Selected and Activated under Selection States and set the highlight color settings for the selected and activated states.

You will not see any of these settings take effect until you start creating buttons. You can configure the settings for all three of the color mapping sets by selecting their buttons (1, 2, and 3).

Note: If you set the Normal opacity to 15 and see other colors around the edges of items in the overlay graphic, the graphic has anti-aliased edges. To prevent the extra colors from appearing, you should either correct the overlay graphic or use the advanced overlay method.

Using Advanced Overlay Color Mapping

Using an advanced overlay, you can map highlight colors to up to four overlay colors. You choose one of two mapping types for the overlay graphic (chroma or grayscale), based on how you created the overlay graphic. See Creating Overlays for details.

Because advanced overlays can have up to four colors, you're more likely to use them to create the normal button states (in addition to the selected and activated states) than you would be with a simple overlay. The following sections describe strategies you can use for each button state.

Normal State

Normal settings determine what a button looks like when not selected or activated. They apply to the entire overlay graphic, not just the areas identified by the button active areas.

- *If the normal state of the button is part of the background (the overlay does not provide button graphics):* You generally set the opacity for each of the overlay colors to 0, making them invisible (and making the highlight colors mapped to them unimportant).
- *If the normal state of the button is not part of the background (the overlay provides the button graphics):* You need to assign a color and opacity for each overlay color for the normal state.

Selected State

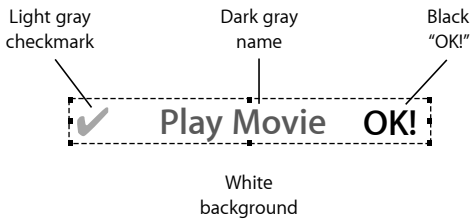
To avoid viewer confusion, it is important to clearly show that a button has been selected. The way you do this depends on whether the normal state of the button is part of the background.

- *If the normal state of the button is part of the background:* The overlay typically provides a highlight by adding something to the existing button, such as an outline or a small graphic (for example, a checkmark, logo, or some text).
- *If the normal state of the button is not part of the background:* You can change the colors and transparency of the overlay colors used for the normal state button. For example, you could have one of the overlay colors be transparent in the normal state and appear as an additional graphic in the selected state.

Activated State

The activated state, like the selected state, must appear clearly to the user. However, the activated state generally appears for only a short time—the amount of time it takes the DVD to process the button's action.

The following is an example of an advanced overlay, showing only one button and using the grayscale mode.



This overlay uses a white background, main text that is dark gray, a light gray checkmark, and a black "OK!"

Using color mapping, you can control how each of these elements appears in each of the three states.

Overlay color	Normal state	Selected state	Activated state
Black	Transparent	Transparent	Yellow, opaque
Dark gray	Yellow, opaque	Yellow, opaque	Brown, opaque
Light gray	Transparent	Green, opaque	Transparent
White	Transparent	Transparent	Transparent

In the above example, for the normal state only the main text (using the dark gray overlay color settings) is visible, with its color set to yellow. When the button is selected, a green checkmark (using the light gray overlay color settings) appears. When activated, the checkmark disappears, the text turns brown, and a yellow "OK!" (using the black overlay color settings) appears.

Setting Up a Menu's Color Mapping Using an Advanced Overlay

The following steps show you how to set up color mapping for a menu when using an advanced overlay. Once you start creating buttons (described in Adding Overlay-Based Buttons), you will be able to select the color mapping sets for them separately.

To set up color mapping for a menu using an advanced overlay

1. Select a menu that has a background and overlay assigned.

   The Menu Inspector appears.
2. Click the Colors tab in the Menu Inspector.
3. Select Advanced next to Overlay Colors.
4. Set the Mapping Type to either Chroma or Grayscale, depending on how the overlay was created.
5. Select Normal under the Selection State.
6. In the Menu Editor, choose Display Composite from the Settings pop-up menu to see the normal color settings take effect as you set them. (You will not see the selected and activated settings take effect until you start creating buttons.)
7. Set the color and opacity settings for the normal selection state.
   - *To choose the color:* Open the Color pop-up menu and choose a color from the 16-color palette that appears.
   - *To set the opacity:* Either enter a new value in the fields to the right of the Opacity sliders, or drag the slider next to the value. The values range from 0 (completely transparent) to 15 (completely opaque).

8 Set the normal color settings based on whether the background includes the normal button graphics.

- *If normal button graphics are included in the background:* Set the opacity for each overlay color to 0 (completely transparent).
- *If normal graphics are not included in the background:* Set the opacity and select the color for each overlay color so that the buttons appear as desired.

9 Select Selected and Activated under Selection State and set the highlight color settings for the selected and activated states.

You will not see any of these settings take effect until you start creating buttons. You can configure the settings for all three of the color mapping sets by selecting their buttons (1, 2, and 3).

Using an Advanced Overlay to Support Anti-Aliasing

Instead of using the advanced overlay's four colors to create multiple color highlights, you can use them to create pseudo-soft edges and take advantage of anti-aliased graphics. This requires you to use the grayscale method, using either white elements on a black background or black elements on a white background. The soft or anti-aliased edges are mapped to the dark and light gray overlay colors. By mapping the same color to each overlay color, but at reduced opacities on the dark and light gray overlay colors that occur at the edges, you can effectively simulate soft or anti-aliased edges.

To configure an advanced overlay for anti-aliased edges

1 Select a menu that has a background and overlay with anti-aliased edges assigned.

The Menu Inspector appears.

2 Click the Colors tab in the Menu Inspector.

3 Select Advanced next to Overlay Colors.

4 Set the Mapping Type to Grayscale.

5 Select Normal under the Selection State.

6 In the Menu Editor, choose Display Composite from the Settings pop-up menu to see the normal color settings take effect as you set them. (You will not see the selected and activated settings take effect until you start creating buttons.)

7 If the overlay should appear in the normal selection state, set the color and opacity settings as follows:

- Choose the same color from the Color pop-up menus for each of the overlay colors.
- Set the opacity for the primary overlay color (usually black) to 15.
- Set the opacity for the next overlay color (dark gray) to 10.
- Set the opacity for the next overlay color (light gray) to 5.

If the overlay should not appear in the normal selection state, set the opacity settings to 0 for each overlay color.

8 Select Selected and Activated under Selection State and set the highlight color settings for the selected and activated states. Set the color and opacity settings using the same method used in step 7. You will not see these settings take effect until you create buttons on the menu.

Configuring the Menu Inspector for Standard Menus

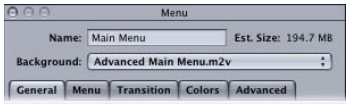
The tabs within the Menu Inspector provide a variety of menu configuration settings. These settings control everything from background and overlay configuration, to transition and timeout settings.

The Menu Inspector has five tabs: General, Menu, Transition, Colors, and Advanced.

The Colors tab changes depending on whether you are using simple or advanced overlay color mapping.

Settings at the Top of the Menu Inspector for Standard Menus

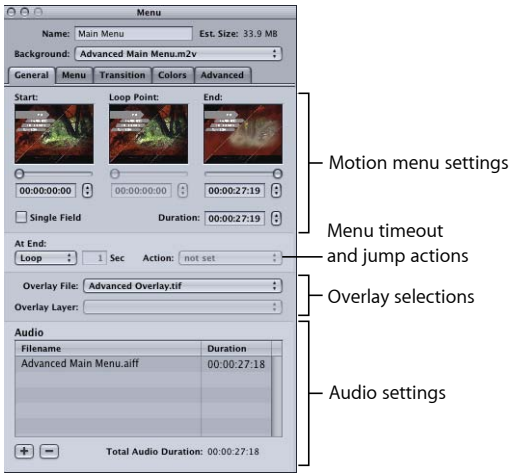
There are three settings at the top of the Menu Inspector:



- *Name:* Enter the name for this menu.
- *Est. Size:* Displays the estimated amount of disc space the menu requires based on the type and duration of the assigned assets.
- *Background:* Choose the menu's background. See Choosing the Menu's Background for more information.

General Tab in the Menu Inspector for Standard Menus

The General tab in the Menu Inspector is divided into four sections: The upper section contains basic menu settings, the next section contains settings for motion menus and menu timeout actions, the next section contains the overlay selection settings, and the bottom section contains the audio file settings.



Motion Menu Settings

The motion menu settings apply whenever you assign a video asset as the menu's background or add audio to the menu. See Configuring Motion Menu Settings for more details on these settings.

- *Start:* Defines the starting frame for the motion background. Use either the slider or timecode field to set this value.
- *Loop Point:* Defines the frame that is jumped back to when the motion background is looped. By default this frame is set to be the same as the Start timecode. This is also the point where button highlights appear and the viewer can begin navigating the buttons. (Because button highlights are still images, you may want to delay their appearance until the buttons stop moving if you are flying them onto the screen.) Use either the slider or timecode field to set this value. This value can also be set by a chapter marker in the background video.
- *End:* Defines the last frame for the motion background. The At End setting becomes active once this frame is reached. Use either the slider or timecode field to set this value.
- *Duration:* Adjusts automatically to match the time between the Start and End settings. Adjusting Duration only affects the End setting.

- *Single Field:* Optimizes playback when using field-based video sources. This is especially important with video that has fast motion, and will reduce any motion artifacts. Selecting Single Field with frame-based video sources results in reduced resolution (edges may appear jagged).
- *At End:* Sets the motion menu action when the End time is reached during playback. Choose one of these settings:
  - *Still:* Freezes the video's last frame once the video asset finishes playing. If there is an audio file assigned, it will also play once and then stop.
  - *Loop:* Activates the Start, Loop, and End controls if there is a video asset assigned as the background. See Configuring Motion Menu Settings for information on using these controls.
  - *Timeout:* Activates the Sec and Action settings. This allows you to configure the menu so that if the viewer does not select a button for a specified amount of time, the title automatically jumps to the element specified with the Action setting.

Menu Timeout and Jump Action

You can set whether a menu appears indefinitely or has a timeout duration. If you set a timeout duration, the title jumps to the element chosen in the Action pop-up menu after the specified amount of time. If the menu has a video asset assigned as the background, the timeout's countdown does not start until the video finishes playing. You'd generally use a timeout setting with titles played at a sales kiosk, where you want to have something playing onscreen as much as possible.

- *Sec:* Enter the amount of time, in seconds, that the menu appears if no button is selected.
- *Action:* Choose the element to jump to once the timeout value is reached. If the menu has a default transition, the transition plays before the element is jumped to.

Overlay Selections

You use these settings only if you are using an overlay with this menu.

- *Overlay File:* Choose the file with the menu's overlay. See Choosing the Menu's Overlay for more information.
- *Overlay Layer:* Becomes active whenever you assign a PSD file with layers as the menu's subpicture overlay. You choose the overlay layer from the pop-up menu.

Audio Settings

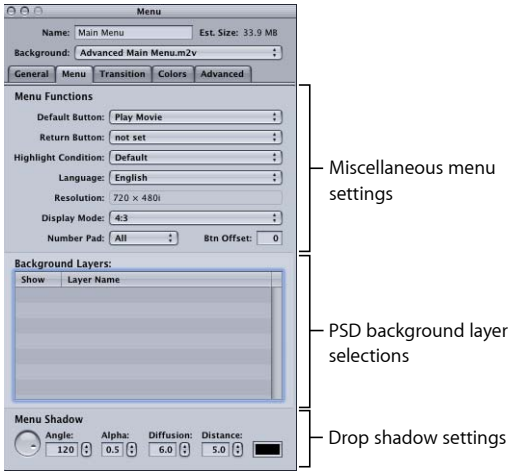
See Adding Audio to a Menu for more information on using the settings in this area.

- *Filename area:* Lists the audio files assigned to the menu. You can add audio files to the menu by dragging them here. You can rearrange their order by dragging the filenames to a new position.

- *Add (+):* Opens the file selection dialog, allowing you to add one or more audio files to the menu.
- *Delete (–):* Removes the selected audio file from the menu.
- *Total Audio Duration:* Shows the combined duration of all audio files assigned to the menu.

Menu Tab in the Menu Inspector for Standard Menus

Most settings in the Menu tab in the Menu Inspector are optional. Exceptions are the Resolution and Display Mode settings, which must be set correctly for each menu, and the Background Layers area that is used when a Photoshop layered file (PSD) is assigned as the background.



Miscellaneous Menu Settings

- *Default Button:* Choose the button to be selected when the menu appears during playback of the title. This setting can be overridden by any element that jumps to this menu, based on its jump setting and the Highlight Condition setting.
- *Return Button:* Choose the project element to jump to if you press the Return button on the DVD player's remote control.
- *Highlight Condition:* Provides an alternative method to the Default Button setting for determining which button to highlight. When Highlight Condition is set to Default, the Default Button setting supplies the button highlight setting. When Highlight Condition is set to one of its stream settings (audio, subtitle, camera angle), the number of the stream last played determines the button to highlight. This setting can be overridden by any element that jumps to this menu, based on its jump setting.
- *Language:* Choose the language in which this menu should be displayed. See Using Languages with Menus for more information.

- *Resolution:* Choose the menu's resolution.
  - *For SD projects:* The resolution is either 720 x 480i (NTSC) or 720 x 576i (PAL).
  - *For HD projects:* You can choose from any of the supported resolutions. DVD Studio Pro Preferences includes a setting for the default resolution. The resolution automatically changes to match the menu's background video resolution if it matches one of the supported resolutions. Choosing a resolution different than that used by the menu's background video results in the menu being scaled and rendered to this setting when you build the project.
- *Display Mode:* Set the aspect ratio for this menu (4:3 or 16:9), and with 16:9, choose how it displays on a 4:3 monitor. The aspect ratio of the background and overlay must match this setting. See Working with 16:9 Menus for more information.
- *Number Pad:* Defines which buttons are directly accessible by a DVD player's numeric keypad. Choose All, None, or a button number from the pop-up menu. When you choose a button number, that button and all buttons less than that number are accessible via the numeric keypad—buttons greater than this value are blocked from direct access.

  Important: This feature is based on the button order as shown along the top of each button's Button Inspector, and not the button names you see in the Menu Editor. See About Button Numbers for information on verifying and changing the button numbers.
- *Btn Offset:* You can use this setting to offset button numbers so they make sense to a viewer who wants to select a button by entering its number. For example, you may have a set of scene selection menus with numbered scenes. One of the menus may have scenes 23 to 34, with the button for scene 23 being the first button on the menu. If you enter an offset value of 22 for this menu, when the viewer enters 23 on the remote control, 22 is subtracted from it, with the result being 1—the button's actual number.

Background Layers Selections

- *Background Layers:* This table becomes active whenever you assign a PSD file with layers as the menu's background. A list of all layers in the file appears, with checkboxes so that you can select which ones to use for the background.

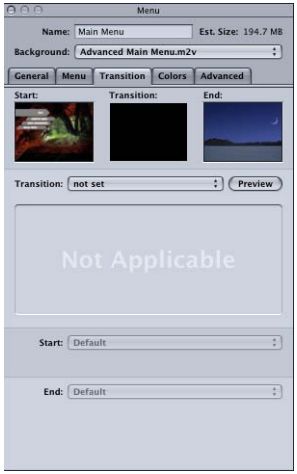
  See Choosing a Menu's Background from a Layered Photoshop File for details on these settings.

Drop Shadow Settings

- *Menu Shadow:* This area configures the drop shadow settings for this menu. See Configuring the Menu's Drop Shadow Settings for more information.

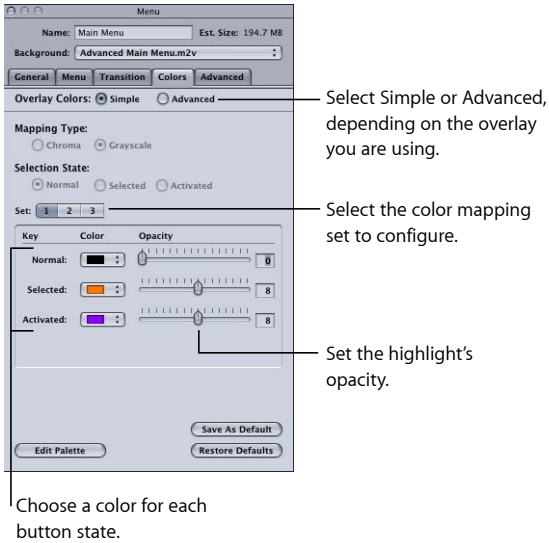
Transition Tab in the Menu Inspector for Standard Menus

The Transition tab is used to configure a button transition for this menu. See Transition Tab in the Menu and Button Inspectors for details on this tab.



Colors Tab in the Menu Inspector with Simple Selected

The following settings are available in the Colors tab in the Menu Inspector when you select the simple overlay color mode.



- *Overlay Colors:* Select the overlay color method to use.
  - *Simple:* Select Simple if you are using a simple overlay.
  - *Advanced:* Select Advanced if you are using an advanced overlay.

- *Set:* Select the color mapping set (1, 2, or 3) to configure. You cannot assign sets to buttons from the Menu Inspector; you must select a button or group of buttons and select their set in the Button Inspector. All new buttons use set 1.

  Note: These sets apply only to the selected and activated states of the buttons. The normal state color mapping setting applies to the entire overlay graphic unless a button's active area is selected or activated. See Color Mapping Sets for more information.

- *Color:* Choose the color for each of the three button states from the current Color Palette.

  Note: This also sets the highlight colors for the black overlay color if an advanced overlay is also used on this menu.

- *Opacity:* Set the opacity for each of the highlight colors. You can use the slider or enter a value from 0 (completely transparent) to 15 (completely opaque).

  Note: This also sets the opacity for the black overlay color if an advanced overlay is also used on the menu.

- *Save As Default:* Saves this color mapping configuration as the default to be used on all new menus you create.

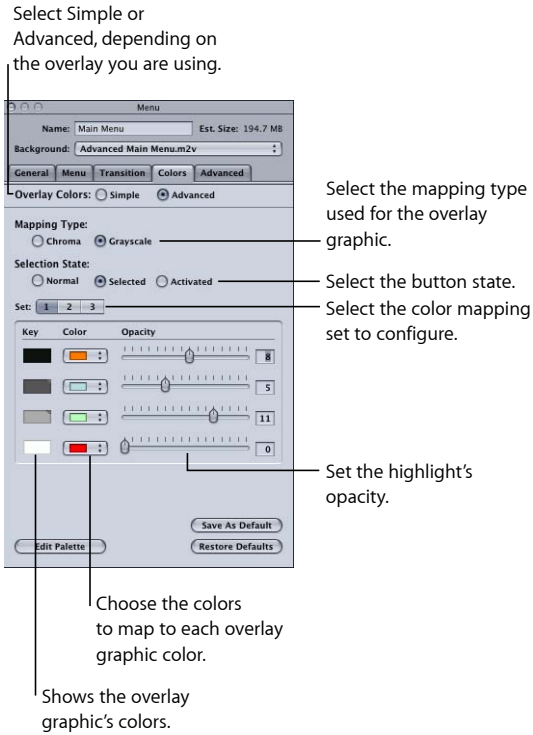
  Simple and advanced overlays use the same default mapping configuration.

- *Restore Defaults:* Replaces the existing settings with those of the default color mapping configuration.

- *Edit Palette:* Displays the Color Palette window, which you can use to change colors within the palette.

Colors Tab in the Menu Inspector with Advanced Selected

The following settings are available in the Colors tab in the Menu Inspector when you select the advanced overlay color mode.



- *Overlay Colors:* Select the overlay color method to use.
  - *Simple:* Select Simple if you are using a simple overlay.
  - *Advanced:* Select Advanced if you are using an advanced overlay.
- *Mapping Type:* Select the colors used to create the overlay graphic.
  - *Chroma:* Chroma uses black, red, blue, and white as the overlay colors.
  - *Grayscale:* Grayscale uses black, dark gray, light gray, and white as the overlay colors.
- *Selection State:* Select the button state you want to configure. This setting also determines which state's colors and transparencies to display.
  - *Normal:* Selects the normal state for configuration and display.
  - *Selected:* Selects the selected state for configuration and display.
  - *Advanced:* Selects the advanced state for configuration and display.
- *Set:* Select the color mapping set (1, 2, or 3) to configure. You cannot assign sets to buttons from the Menu Inspector—you must select a button or group of buttons and select their set in the Button Inspector. All new buttons use set 1.

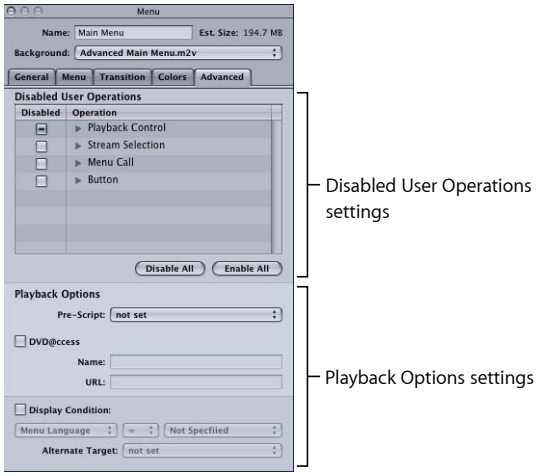
Note: These sets apply only to the selected and activated states. The normal state color mapping setting applies to the entire overlay graphic unless a button's active area is selected or activated.

- *Key:* Shows the overlay file's colors as selected with the Mapping Type.
- *Color:* Choose the color for each of the four overlay colors from this pop-up menu, which displays the current Color Palette. You must do this for all three button states.
- *Opacity:* Set the opacity for each of the highlight colors. You can use the slider or enter a value from 0 (completely transparent) to 15 (completely opaque).
- *Save As Default:* Saves this color mapping configuration as the default to be used on all new menus you create.

  Simple and advanced overlays use the same default mapping configuration.
- *Restore Defaults:* Replaces the existing settings with those of the default color mapping configuration.
- *Edit Palette:* Displays the Color Palette window, which you can use to change colors within the palette.

Advanced Tab in the Menu Inspector for Standard Menus

The Advanced tab in the Menu Inspector for standard menus contains settings that are used only in specialized projects.



Disabled User Operations Settings

- *Disabled User Operations:* Select the functions that you want to be disabled while this menu plays. See User Operations for more information.

Playback Options Settings

- *Pre-Script:* Choose a script to run before the menu appears. This script can decide whether to show the menu or configure the DVD player before showing it. See Pre-Scripts for information on pre-scripts.
- *DVD@CCESS:* Selecting this checkbox allows you to add DVD@CCESS links, which provide additional functionality to your title when played on a computer. See DVD@CCESS for more information.
- *Display Condition:* Selecting this checkbox enables the Display Condition settings that control whether or not this menu should be displayed and to define what should be displayed if not this menu. See Display Condition for more information.

Adding Buttons to Your Menu

Once you have set your background and overlay, you are ready to start adding buttons to your menu.

You can add buttons either by creating active areas in the overlay or by dragging shapes to the Menu Editor. You can then set each button's properties, such as what the button jumps to when activated and how to navigate from it when using the DVD player's remote control.

The number of buttons a menu can have depends on the DVD standard and its display mode.

SD Projects

- Menus using a 4:3 display mode can have up to 36 buttons.
- Menus using a 16:9 Pan-Scan or 16:9 Letterbox display mode can have up to 18 buttons.
- Menus using a 16:9 Pan-Scan & Letterbox display mode can have up to 12 buttons.

HD Projects

- Menus using a 4:3 display mode can have up to 48 buttons.
- Menus using a 16:9 Pan-Scan or 16:9 Letterbox display mode can have up to 24 buttons.
- Menus using a 16:9 Pan-Scan & Letterbox display mode can have up to 16 buttons.

Adding Overlay-Based Buttons

To add an overlay-based button, you must identify each button's "active area." The active area is where selected and activated state highlights will occur, whether the title is played on a set-top DVD player or on a computer. Additionally, when the title is played on a computer, the active areas also determine the area in which a mouse-click activates the button.

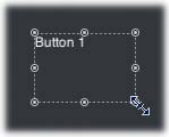
To create the active area, you use the pointer to drag over the area containing the button's elements. See the next section for details.

Creating and Modifying Button Active Areas

While you can create a button's active area without a background or overlay assigned, most of the time you will need to assign them first so you know where to place the button active areas. See Creating Menus Using the Standard Method and Creating Menus Using the Layered Method for details on assigning these files.

To create and modify a button's active area

1 Click the menu background where you want one of the button's corners to be, then drag to the opposite corner. You see a rectangle with dashed lines.



2 Do any of the following to modify the button's active area:

- *To move the button by dragging:* Click inside the dashed lines and drag it to the new position.
- *To move the button by dragging in one direction only (horizontal or vertical):* Press the Shift key, then drag the button.
- *To move the button by dragging with snapping and the dynamic guides temporarily disabled:* Press Command, then drag the button.
- *To move the button using the arrow keys:* Select the button and press the arrow keys to move it one pixel at a time. Press Shift and the arrow keys to move it 10 pixels at a time, or press Shift-Option and the arrow keys to move it 20 pixels at a time.
- *To move an edge:* Click the resize handle at the center of the edge and drag it to the new position. This changes the button's size.
- *To move a corner (which moves two edges at once):* Click the resize handle at the corner and drag it to the new position. This also changes the button's size.
- *To change a button's size while maintaining the button's aspect ratio:* Shift-drag an edge or corner. See Working with Assets in Buttons and Drop Zones for more information.
- *To change a button's size while keeping it centered at its current location:* Click an edge or corner, start dragging, then press the Option key.
- *To delete a button:* Select it (resize handles appear on its dashed line), then press the Delete key.

You can also use the Coordinates & Size area in the Advanced tab in the Button Inspector to precisely set a button's size and position.

Viewing the Selected and Activated States

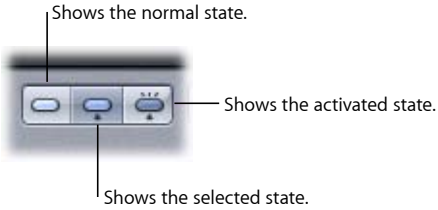
You can view the highlights for all three button states when you have a button selected. This makes it easy to see how the color mapping settings interact with the overlay.

To view and set highlights for a button

1 In the Menu Editor, choose Display Composite from the Settings pop-up menu.

The Menu Editor displays both the background and the overlay based on the color mapping settings.

2 Use the Menu Editor's button state buttons to select the state (normal, selected, or activated) to display.



3 With the button state set to either selected or activated, select Highlight Set 1, 2, or 3 in the Style tab in the Button Inspector to select the color mapping configuration to apply to the current button.

Note: The Set 1, 2, and 3 buttons in the Button Inspector's Colors tab are for configuring the sets. They do not apply the sets to the current button.

Why Don't Highlight Colors Appear Without an Overlay?

In earlier versions of DVD Studio Pro, you could see the selected and activated highlights in the active area rectangle even without an overlay. This made it easy to create a menu by just creating underlines (which were short and wide active areas) that showed the selected and activated highlights.

The shapes feature of DVD Studio Pro 4 includes a SimpleButton shape that you can use to create these same types of highlights. By applying the SimpleButton shape to the first button active area you add to a menu, and then setting that button to be the menu's default, all subsequent buttons will automatically have the SimpleButton shape and will show the selected and activated highlights.

See the following section, Adding Shapes to a Menu, for information on applying shapes, and Setting Default Styles for information on defining a menu's default button style.

Adding Shapes to a Menu

There are two ways to add a shape to a menu:

- Drag it from the Shapes tab in the Palette.

- Create a button active area, then select the shape from the Button Inspector.

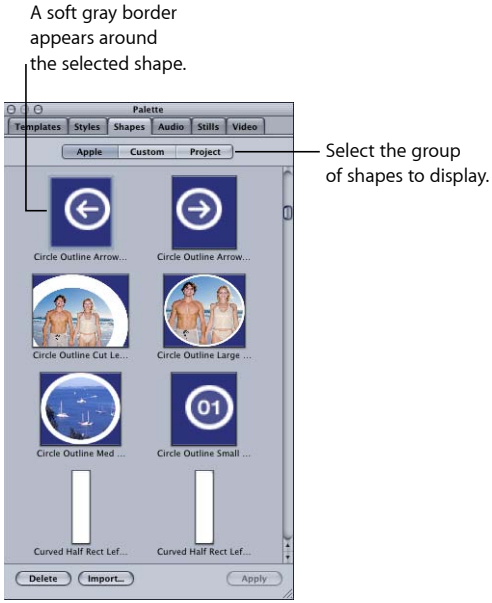
When you drag a shape from the Palette, it appears at its actual size, as created in the graphics program. When you add a shape by assigning it to an active area, it is scaled to fit the area, which can make it appear squashed or stretched.

Dragging a Shape from the Palette

The Palette offers three groups of shapes and shows you thumbnails of all the shapes you have to choose from.

To drag a shape from the Palette

1 Select the Shapes tab in the Palette.



2 Select the group of shapes to display:

- *To display the shapes included with DVD Studio Pro:* Click Apple.

  Note: Not all shapes supplied with DVD Studio Pro support highlights. Some are intended to be used only with drop zones and do not include the highlight layer used by buttons.

- *To display the shapes that have been imported for use by all projects:* Click Custom.
- *To display shapes imported for use by this project only:* Click Project.

3 Scroll through the available shapes, then select the one you want to use.

4 To add the shape to any empty part of the menu, drag it to the Menu Editor. If you hover over the area for a second, the Drop Palette appears, where you can choose to create a button or drop zone. See Adding Drop Zones to Your Menu for additional information about drop zones.

5 To apply the shape to an existing button, select the button in the Menu Editor, then do one of the following:

- Click Apply in the Palette.
- Drag the shape to the button.

When dragged to an empty part of the menu, the shape becomes a button and appears at its actual size. You can move it and change its size by either dragging it or entering coordinate and size values in the Advanced tab in the Button Property Inspector.

When applying or dragging the shape to an existing button, the shape's size changes to match the existing button's size.

Assigning a Shape in the Button Inspector

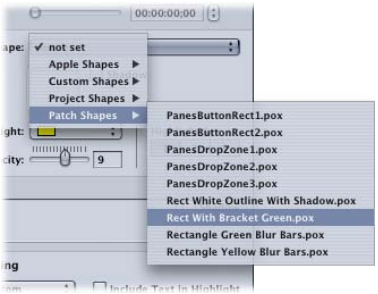
In the Button Inspector, you can select from the same shapes displayed in the Palette.

To assign a shape in the Button Inspector

1 In the Menu Editor, select the button you want to apply the shape to.

2 Click the Style tab in the Button Inspector.

3 Choose a shape group from the Shape pop-up menu, then choose the shape to use.



A thumbnail of the shape appears in the Button Inspector and the shape is applied to the button.

The shape's size changes to fit the button's active area. You can move the button and change its size by either dragging it or entering coordinate and size values in the Advanced tab in the Button Inspector. See Managing Shapes for information on the different types of shapes available and details on how to import your own shapes.

Copying a Button

You can make a copy of a button to use on the same menu.

To make a copy of a button

1 Select the button to be copied in the Menu Editor.

2 Hold down the Option key, then drag the button's copy to its new location.

The copy is automatically given the same name as the original, with a number added to distinguish it. The copy has all the same properties as the original, including its Target and navigation settings.

Setting a Button's Connection

The main purpose of a button is to provide a way for the viewer to jump to a new disc location. For this to work, you must assign an element from your project as the button's connection.

There are several ways to set a button's connection:

- Using the Target setting in the Button Inspector
- Using the shortcut menu that appears when you Control-click a button
- Using the Connections tab. See Establishing Connections for more information.

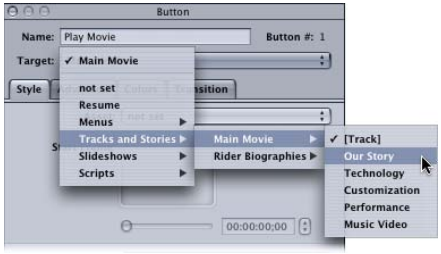
In some cases, when using the dragging methods to add assets to a menu and selecting options from the Drop Palette, the connection is automatically set. See Dragging Assets to the Menu Editor for more information.

You can see a button's current connection by placing the pointer over it and reading the tooltip that appears.

To set a button's connection in the Button Inspector

1 Select the button whose connection you want to set.

2 Choose the element to connect to from the Target pop-up menu in the top section of the Button Inspector.



To set a button's connection using the shortcut menu

- Control-click the button whose connection you want to set, choose Target from the shortcut menu, then choose the element to connect to from the submenus.

A checkmark appears next to the currently selected target.

Those elements that can have a pre-script assigned to them (menus, tracks, stories, and slideshows) are listed in square brackets. Setting a button's target to the element in brackets allows the pre-script, if one is assigned to the element, to run before the element appears. If you set the target to anything else in the list, the pre-script is not run. See Pre-Scripts for more information.

About Resume

If you jump to a menu while watching a track, for example, by pressing the remote control's Menu button, the DVD player remembers what track you were playing and how far you were into it.

A mostly unknown feature of DVD players is that you can press the Menu button while in a menu to resume playing the track at the same place you jumped from.

Creating a button on the menu and setting its Target to Resume provides the viewer with a more obvious way to resume playing the track.

About Button Properties

When you select or create a button, the Button Inspector appears.

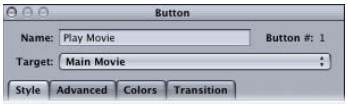
Note: There is a different Button Inspector for buttons on layered menus. See About Layered Menu Button Properties for more information.

There are four tabs in the Button Inspector: Style, Advanced, Colors, and Transition. See the following sections for details:

- Settings at the Top of the Button Inspector
- Style Tab in the Button Inspector
- Advanced Tab in the Button Inspector
- Colors Tab in the Button Inspector
- Transition Tab in the Button Inspector

Settings at the Top of the Button Inspector

There are three settings at the top of the Button Inspector.



- *Name:* By default, buttons you manually add are named "Button _," where "_" is the button number on that menu. To reduce confusion when viewing a list of the menu's buttons, it is helpful to rename the buttons based on their functions.

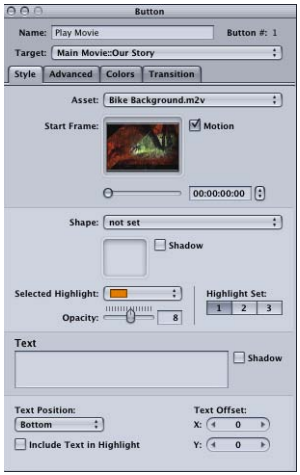
  Note: Buttons created as a result of a Drop Palette action that creates other project elements are named after the new project elements. In the case of actions that create a new track, the button and the track are named after the video asset.

- *Button #:* Next to the button's name is its number. This number is based on the order in which the buttons are added to the menu. See About Button Numbers for information on changing this number and why it can be important.

- *Target:* You can use this pop-up menu to define a button's action when activated. (You can also use the Connections tab or Control-click the button.) Often you must set the connection later because what you want to jump to has not yet been added to the project. The pop-up menu contains all possible elements you can jump to.

Style Tab in the Button Inspector

The Style tab of the Button Inspector contains the most commonly used settings.



- *Asset:* Use this pop-up menu to assign an asset to the thumbnail of the shape (if present) or, when there is no shape, to the button's active area. You can choose any existing applicable assets.
- *Start Frame:* When the asset assigned to this button is a video clip, this area displays the video. Use the slider or timecode entry to choose the start point for motion playback (if motion is enabled) or to choose the frame to use in the button's thumbnail if motion is not enabled.
- *Motion:* Select this checkbox to enable motion in the button when the button's asset is a video clip. See Configuring Motion Menu Settings for looping details with motion buttons.
- *Shape:* Use this pop-up menu to choose a shape to assign to the selected button. A thumbnail image of the selected shape appears next to the pop-up menu. The pop-up menu lists the existing shapes by their names, grouped as Apple Shapes (supplied with DVD Studio Pro), Custom Shapes (added shapes available to all projects), Project Shapes (added shapes available to this project only), and Patch Shapes. Use the Palette's Shapes tab to manage the shapes and as another way to select a shape.
- *Shadow:* Select this checkbox to apply the menu's drop shadow setting to this shape.
- *Selected Highlight:* Choose the button's selected state highlight color from the 16-color palette.

  Note: This does not affect the button's normal or activated states. Use the settings in the Colors tab for those highlights.
- *Highlight Set:* Select the color mapping set (1, 2, or 3) to use for this button.

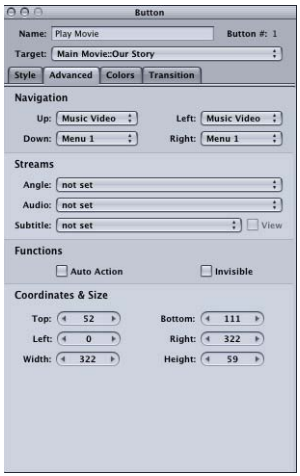
- *Opacity:* Use this slider or enter a numeric value to set the selected highlight's transparency from 0 (completely transparent) to 15 (completely opaque).

  Note: The Selected Highlight and Opacity settings affect the black color mapping settings for the selected color mapping highlight set. These settings affect all buttons on this menu, including overlay buttons, that use the same color mapping set.

- *Text:* You can type text directly on the button in the Menu Editor or type it in this text area, then press Return to apply it to the button. To start a new line, press Option-Return. See Adding Text to a Button for more information.
- *Shadow:* Select this checkbox to apply the menu's drop shadow setting to this button text.
- *Text Position:* Choose where you want to place the text when adding text to a button. Choices include Bottom, Top, Right, Left, and Center. Use the Center setting when creating a text-only button.
- *Text Offset X and Y:* Adjust the position of the text using these settings. For the horizontal (X) offset, positive numbers move the text to the right and negative numbers move it to the left. For the vertical (Y) offset, positive numbers move the text down and negative numbers move the text up.
- *Include Text in Highlight:* Select this checkbox to make the button text highlight when the button is selected or activated.

Advanced Tab in the Button Inspector

The Advanced tab of the Button Inspector contains settings you can use to fine-tune a button.



- *Navigation:* The pop-up menus in this area let you set the actions that take place when the viewer uses the arrow buttons on the DVD player's remote control to navigate around the title. Because this is the typical way the title will be viewed, it is important to spend some time configuring the navigation in a logical, predictable way. See Configuring Button Navigation for information.
- *Angle/Audio/Subtitle Streams:* Use these three pop-up menus to connect a button to specific audio, subtitle, and angle streams to play back. For the subtitle stream, you can also choose whether subtitles should appear.
- *Auto Action:* If you enable Auto Action for a button, it will activate automatically as soon as it is navigated to, without the viewer needing to press Enter. This is useful in menus, such as scene selection menus, in which you use Next and Previous buttons; you can assume that if viewers navigate to the Next or Previous button, they want to activate it.

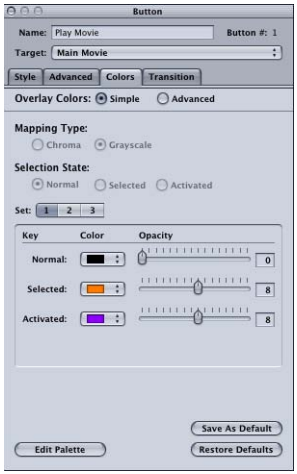
  With overlay-based buttons, if you select this option, only the activated color mapping appears when the button is navigated to, skipping the selected color mapping.

  Important: When viewed with most software-based DVD players, such as the Apple DVD Player, auto action buttons must be clicked if a mouse is used to select buttons. If you use the computer's arrow keys, however, auto action buttons activate automatically as with set-top DVD players.

- *Invisible:* Applies to overlay-based buttons. This option allows you to have a button that does not display highlights in the normal, selected, or activated state. This is useful when you want to have a menu with text and no visible buttons. The text could tell the viewer to press the Enter button to go to the next menu or start playback (or whatever the button is set to jump to).
- *Coordinates & Size:* This area lets you set the location of each edge of the button's active area, plus the area's height and width. The upper-left corner of the menu is at pixel 0, line 0. You can enter values for each edge, allowing you to precisely position and size the button's active area. (You can also drag the active area and each of its edges with the pointer.)

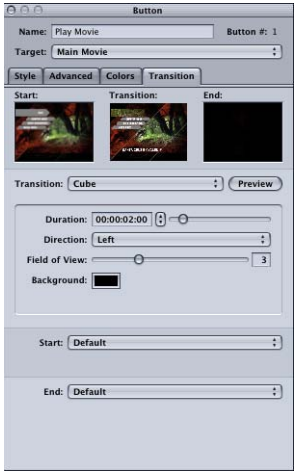
Colors Tab in the Button Inspector

The Colors tab works exactly as does the Colors tab in the Menu Inspector. See Colors Tab in the Menu Inspector with Simple Selected and Colors Tab in the Menu Inspector with Advanced Selected for information on this tab.



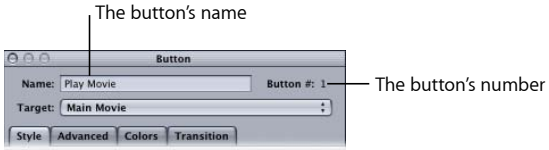
Transition Tab in the Button Inspector

The Transition tab is used to configure a button transition for this button. See Transition Tab in the Menu and Button Inspectors for details on this tab.



About Button Numbers

Each time you add a button to a menu, in addition to its name (which you can change), it is assigned a number (which you cannot directly change) based on the order in which you added it to the menu.



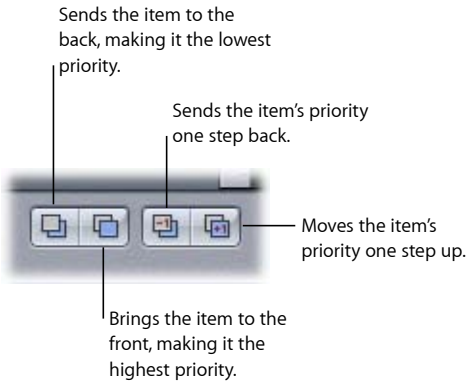
The first button you manually add to a menu is named and numbered "Button 1," the second is "Button 2," and so on. How a button fits in the order is important for four reasons:

- Button number 1 is the default button selected when the menu plays if no other button has been set as the menu's default button.
- The button order determines the priority of the buttons if they overlap. Higher numbered buttons have a higher priority and can cover up lower numbered buttons.
- The button order affects the creation of chapter index menus (see Applying Templates or Layout Styles to a Menu with Buttons).
- The button order affects the number pad setting for viewers directly accessing a menu's buttons from the DVD player's remote control.

While you cannot change this number in the Button Inspector, you can change it using the shortcut menu that appears when you Control-click a button.

When you Control-click a button, a shortcut menu appears that allows you to rearrange the button order (and also set other button properties).

There are also four buttons along the bottom of the Menu Editor (the Arrange controls) that allow you to rearrange the button order.



- *Send To Back:* Makes the selected button button 1, the lowest priority button. The existing button 1 now becomes button 2, and so on. The button names don't change, however. You can also press Command-Shift-B to send it to the back.
- *Send Backward:* Swaps the selected button's number with the button below it, making it a lower priority than the button below it. If this is button 12, then it becomes button 11, and button 11 becomes button 12. You can also press Command–Left Bracket ([) to send it backward.
- *Send Forward:* Swaps the selected button's number with the button above it, making it a higher priority than the button above it. If this is button 12, then it becomes button 13, and button 13 becomes button 12. You can also press Command–Right Bracket (]) to send it forward.

- *Bring to Front:* Makes the selected button the highest priority button on the menu. All buttons that were above it move down one number. You can also press Command-Shift-F to bring it to the front.

The priority is generally not important unless you overlap your buttons or you intend to use this layout as a style for creating chapter index menus. (Overlapping is discouraged; see About Overlapping Buttons for more information.)

Note: Drop zones, text objects, and buttons are included in the same priority list; a drop zone can have a higher priority, and thus cover up, a button.

Adding Text to a Button

You can add text to any button on a standard menu. You can even create text-only buttons by creating a button active area and then adding the text to it.

The default text font and color are set in the Text pane in DVD Studio Pro Preferences.

To add text to a button

1. Make sure the Style tab in the Button Inspector is displayed.
2. To add the text, do one of the following:
   - Select the button in the Menu Editor, then press Return. An insertion point appears at the bottom of the button. Type your text here. Press Return to add an additional line, or press Enter to exit the text entry mode.
   - Select the button in the Menu Editor, then type the text in the Text entry area of the Button Inspector. To add an additional line, press Return or Enter.
   - Select the button in the Menu Editor, then click just below its active area. An insertion point appears. Type your text. Press Return to add an additional line, or press Enter to exit the text entry mode.

   Note: The default settings in the Button Inspector's Text Formatting section at the bottom of the Style tab place the text at the bottom of the button. You can change these settings before typing the text, in which case the text appears at the new position.
3. Select the Shadow checkbox (next to the text entry area) to apply the menu's drop shadow settings to the text.
4. Choose the text's position (Bottom, Top, Left, Right, or Center) from the Position pop-up menu. You can use the X Offset and Y Offset entries to fine-tune the position.
5. Select Include Text in Highlight if you want the text to highlight along with the button when selected or activated.

   You can edit the text by clicking within it or by dragging the pointer over the portion of the text to be replaced, then typing the new text.

The button's active area extends to include the text if you choose to include the text in the highlight. Use care to ensure that the active area does not inadvertently overlap other buttons on the menu.

Setting the Button Text's Font and Color

A button's text can use a mix of colors and fonts.

To change the text font and color

1. Select the text you want to change.
2. Do one of the following to open the Font panel:
   - Choose Format > Font > Show Fonts (or press Command-T).
   - Click Fonts in the toolbar.
3. Choose the font and size to use.
4. Do one of the following to open the Colors window:
   - Choose Format > Font > Show Colors (or press Command-Shift-C).
   - Click Colors in the toolbar.
5. Choose the color to use.

You can also add bold, italic, and underline attributes to the text.

Note: The bold and italic attributes are available only if the current font supports them.

To apply bold, italic, and underline attributes

1. Select the text you want to change.
2. Choose Format > Font > Bold (or press Command-B) to add the bold attribute.
3. Choose Format > Font > Italic (or press Command-I) to add the italic attribute.
4. Choose Format > Font > Underline (or press Command-U) to add the underline attribute.

By selecting different parts of the button's text, you can mix different fonts, colors, and attributes on the same button.

Creating Text-Only Buttons

You can create text-only buttons that only have the text as their graphic. This is useful if you want a simple button that says something like "Play Movie." By centering the text in the button and configuring the button so that the selected and activated highlights apply to the text, you can create a button that works well in a DVD title.

To create a text-only button

1. Create a button active area by dragging in the Menu Editor.
2. Add text to the button, either in the Button Inspector or by typing directly in the Menu Editor.
3. Set the text's font and color.

4 In the Style tab in the Button Inspector, choose Center for the Position, and select Include Text in Highlight.

5 Adjust the size of the button's active area so that it fits the text.

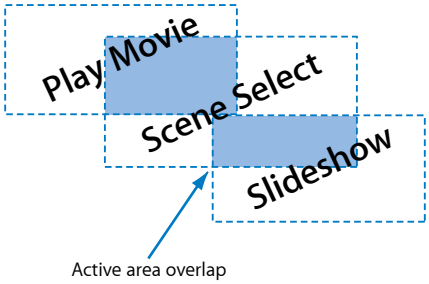
You can now set the button's selected and activated highlights as you would any simple overlay graphic.

Note: If you open a DVD Studio Pro project that uses a font that is not on the computer you are opening it on (either because the font was deleted or the project was created on a different computer), any items using the missing font have a different font substituted with no warning.

About Overlapping Buttons

In general, it's a good idea to avoid overlapping buttons. Some DVD players may behave erratically when they try to process menus with overlapping buttons. This problem is worse if you are playing the title on a computer and using a pointer to select a button.

Sometimes, however, while the button graphics do not actually overlap, their active areas do.



In this case, if viewers watch the title on a computer, they may get unexpected results if they click in an overlap area.

Another problem occurs when using overlay-based buttons. Because the active areas control the overlay area that is highlighted when you select or activate a button, you may end up with portions of neighboring buttons highlighting at inappropriate times. It is possible to get around this problem by using different color mapping sets on neighboring buttons. See Color Mapping Sets for more information.

Configuring Button Navigation

Because most viewers will use the arrow buttons on a DVD player's remote control to navigate through the buttons on a menu, it's important that the navigation is easy and logical.

DVD Studio Pro includes three methods for setting button navigation:

- *Dragging:* In the Menu Editor, you can Command-Option-drag the resize handle on each button's edge to the button it should navigate to.
- *Manually:* You can manually set each button's navigation using the Navigation section in the Button Inspector's Advanced tab.
- *Auto Assign:* You can use the Auto Assign feature in the Menu Editor. This sets the navigation for all buttons on the menu at the same time.
- *Continuous Auto Assign:* You can use the Continuous Auto Assign feature in the Menu Editor. This sets the navigation for all buttons each time you add a new button or reposition an existing button. This feature is activated when you first open DVD Studio Pro. See Setting Button Navigation with Continuous Auto Assign for more information.

In general, if you are manually setting button navigation or modifying automatic button navigation, you should wait until all buttons have been added to the menu, ensuring that all possibilities are taken into account. It is also helpful to name each button before setting the navigation so that you can easily distinguish them from each other.

Setting Button Navigation Manually by Dragging in the Menu Editor

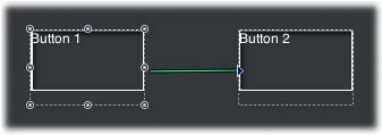
You can set button navigation in the Menu Editor by dragging a button's edge to the button that it should navigate to. Each edge of a button corresponds to an arrow button on a remote control. For example, dragging the right edge of a button determines what will happen when you press the Right Arrow button.

To set button navigation by dragging button edges

1. Select the button whose navigation you want to set.

   The active area rectangle appears around it.

2. Hold down the Option and Command keys and click the resize handle on the edge you want to set. For example, click the right edge to set the right-arrow jump for the button.
3. Drag from the resize handle to the button you want to link to. A line appears to indicate which edge you started at.



4. As you drag, the line's color changes from white to green once you reach a button's active area. When the line is green, release the mouse button to make the connection.

   Once the connection is made, the line disappears.

The biggest drawback to setting navigation this way is that, unless you verify the connections carefully, you can easily miss setting all four edges of all buttons, resulting in some peculiar navigation.

Setting Button Navigation Manually with the Button Inspector

You can manually set each button's navigation using the Button Inspector. You can also change a button's navigation that has been set with the Auto Assign feature.

To manually set button navigation

1. Select a button.
2. Click the Advanced tab in the Button Inspector.
3. In the Navigation area, open the pop-up menu for each direction (left, right, up, and down) and choose the button that should be jumped to for each. Leave the setting at "not set" if you do not want an action to occur when a viewer presses a particular arrow button.

Each button's settings are completely independent. The settings you make for one button have no effect on the other buttons in the menu.

Setting Button Navigation with the Auto Assign Feature

The Auto Assign feature makes it easy to configure the button navigation for a menu. You can also use it as a starting point for configuring your navigation, and then freely adjust the settings it creates.

To use Auto Assign to set button navigation

1. Set up your menu as you want it, with its buttons in their final locations.
2. Choose Auto Assign Buttons Now from the Menu Editor's Settings pop-up menu (or press Command-Shift-D).

It's important to understand that Auto Assign works with the buttons as they currently exist on the menu. If you move, delete, or add buttons to the menu, you need to use Auto Assign again to update the navigation.

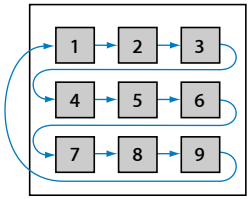
Note: Using Auto Assign overrides any existing navigation settings. If you intend to manually modify the settings Auto Assign creates, be sure you have all buttons in place before using it. This reduces the risk of having to use Auto Assign again, and undoing any modifications you may have made.

How Auto Assign Works

Auto Assign strives to configure the navigation in a logical manner. For example, pressing a Right Arrow button on the remote control selects the button to the right (if there is one). If a menu has a peculiar button layout, however, Auto Assign can produce surprising results.

Auto Assign uses the following rules when configuring the navigation:

- It assigns every button a navigation setting. This is an advantage, because you may accidentally skip a button when manually assigning navigation, resulting in orphaned buttons.
- The navigation loops through all buttons. When you reach the edge of a menu and press the same arrow button on the remote again, you jump to the menu buttons in the next row at the opposite edge. This means that if you keep pressing any of the arrows, you will eventually get to all menu buttons.



Setting Button Navigation with Continuous Auto Assign

The Menu Editor includes a Continuous Auto Assign feature that updates the navigation of all buttons on the menu each time you add a new button or move an existing one. You are unable to manually assign button navigation while the Continuous Auto Assign feature is active.

To enable Continuous Auto Assign

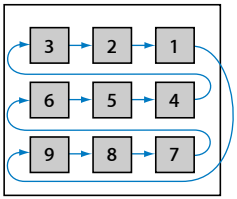
- Choose Auto Assign Buttons Continuously from the Menu Editor's Settings pop-up menu.

The Continuous Auto Assign feature remains enabled until you choose it again to disable it.

Unlike using the Auto Assign feature, you can enable the Continuous Auto Assign feature before the buttons are in their final positions—you can even enable it before you have added any buttons to the menu.

Right-to-Left Reading Mode

Auto Assign and Continuous Auto Assign have a Right-to-Left Reading option, designed for use with titles whose viewers are used to reading right-to-left (such as Farsi and Hebrew). To use the Right-to-Left option, choose the appropriate setting in the Menus pane in DVD Studio Pro Preferences.



The illustration above shows the path for a menu intended for viewers familiar with right-to-left reading. Note that the difference is in what happens when you reach a menu edge; when you are not on an edge, the arrow buttons work the same in both reading modes.

Adding Drop Zones to Your Menu

Drop zones are similar to buttons; you can assign an asset to them, move them around, and change their size. Unlike buttons, however, they do not have jump targets and they are not counted as buttons in the menu's button count.

Drop zones allow you to add graphics to a menu that you would otherwise have had to add to the background using an external video editing application.

To create a drop zone by dragging an asset

1. Drag a still image, video clip, or shape to an empty part of the Menu Editor. You can drag this from the Assets tab, the Palette, or a Finder window.
2. Choose Create Drop Zone from the Drop Palette.

   A 120-pixel high by 180-pixel wide rectangle appears, with the still image, video clip, or shape filling it. You can position and resize the drop zone the same as you would a button's active area. See Working with Assets in Buttons and Drop Zones for more information.

To create a drop zone by drawing a rectangle

- Hold down the Option key while dragging to create a rectangle in the Menu Editor, similar to the way you create a button's active area.

You can use the Drop Zone Inspector or drag to assign a shape and asset to the drop zone.

To convert a button to a drop zone

Do one of the following:

- Choose Project > Convert Button to Drop Zone.
- Control-click the button, then choose Convert Button to Drop Zone from the shortcut menu.

The name of the drop zone is "DropZone _," with "_" being the next available number.

To convert a drop zone to a button

Do one of the following:

- Choose Project > Convert Drop Zone to Button.
- Control-click the button, then choose Convert Drop Zone to Button from the shortcut menu.

The name of the button is “Button _,” with “_” being the next available number.

Once you have created a drop zone, you can drag an asset to the drop zone, or select an asset in the Drop Zone Inspector. See Working with Assets in Buttons and Drop Zones for more information.

Setting Drop Zone Properties

The Drop Zone Inspector appears once you create a drop zone. It contains basic settings for configuring the drop zone.

- *Name:* Enter a name for the drop zone.
- *Asset:* Use this pop-up menu to assign an asset to the drop zone. You can choose any applicable assets.
- *Start Frame:* When the asset assigned to the drop zone is a video clip, this area displays the video. Use the slider or the timecode entry to choose the start point for motion playback (if motion is enabled) or to choose the frame to use in the drop zone if motion is not enabled.
- *Motion:* Select this checkbox to enable motion in the drop zone when the drop zone’s asset is a video clip. See Configuring Motion Menu Settings for details on looping video within drop zones.
- *Shape:* Use this pop-up menu to choose a shape to assign to the selected drop zone. A thumbnail image of the selected shape appears next to the pop-up menu. The pop-up menu lists the existing shapes by their names, grouped as Apple Shapes (supplied with DVD Studio Pro), Custom Shapes (added shapes available to all projects), Project Shapes (added shapes available to this project only), and Patch Shapes. Use the Palette’s Shapes tab to manage the shapes and as another way to select a shape.

- *Shadow:* Select this checkbox to apply the menu's drop shadow setting to this drop zone.
- *Coordinates & Size:* This area lets you set the location of each edge of the drop zone, plus the drop zone's height and width. The upper-left corner of the menu is at pixel 0, line 0. You can enter values for each edge, allowing you to precisely position and size the drop zone. (You can also drag the drop zone and each of its edges with the pointer.)
- *Rotation:* Rotate the knob or enter a value to rotate the drop zone. The values can go from 0.0 to 359.9, with a value of 0.0 as normal.

About Using Drop Zones

Any drop zones you add to your menu will become part of the menu's background when the project is built.

Overlapping Drop Zones

While you should avoid overlapping buttons, you can feel free to overlap drop zones, because they are not involved in navigation. Because drop zones can be overlapped, you should use care when adding them to the menu—those added later have a higher priority and will cover up those added earlier.

To change a drop zone's priority

- Control-click it, then choose an option from the shortcut menu. See About Button Numbers for more information.

Note: Drop zones, text objects, and buttons are included in the same priority list; a drop zone can have a higher priority, and thus cover up a button.

Shapes in Drop Zones

While shapes are primarily intended to be applied to buttons, they can be useful when applied to drop zones, too.

Without a shape, a drop zone usually has a rectangular outline, because that is the shape of the still images and video clips you can add to the drop zones. Shapes, however, can have an irregular outline, and when applied to a drop zone, the irregular outline is maintained. This makes it possible to have heart- or star-shaped drop zones—or any shape you want to create and import. Using a shape in a drop zone, you could add your corporate logo to your menus without having to composite it externally.

Shapes with patches can also be used with drop zones. See Adding Shapes to a Menu for more information.

Note: A drop zone can also have an irregular edge if the asset assigned to it has an alpha channel. See Creating Graphics for Drop Zones and Buttons for more information.

Working with Assets in Buttons and Drop Zones

A button's or drop zone's active area aspect ratio may not match the aspect ratio of the asset assigned to it. In these situations, part of the asset ends up being cropped off. You have two options for working with the asset:

- You can leave the active area's aspect ratio as it is, and move the asset to control which part of it is cropped off.
- You can force the active area's aspect ratio to match the asset's aspect ratio.

Positioning Images in a Button or Drop Zone

If you want to keep the button's or drop zone's active area at its current aspect ratio, you can position the asset within the active area, choosing which parts of the asset are cropped off.

To position an asset in an active area

- Shift-Option-click the asset within the active area, then drag it.

The active area remains where it is, and the asset moves within it (similar to moving a picture behind a window).

Matching the Active Area Aspect Ratio to the Asset

If you want the asset to appear without being cropped, you need to adjust the active area's aspect ratio to match the asset's aspect ratio.

To match the active area's aspect ratio to the asset's aspect ratio

- Shift-drag a corner of the active area.

The active area snaps to match the asset's aspect ratio, ensuring none of it is being cropped off. As long as you hold down the Shift key while changing the active area's size, this aspect ratio is maintained.

Adding Text Objects to a Menu

You can type text directly onto a menu's background, creating a text object. When you build the project, this text object merges with the background—it cannot be selected by the viewer or have jump actions assigned to it.

A text object can contain characters with different colors, fonts, and sizes. The Text pane in DVD Studio Pro Preferences contains settings that define the text font and color used when you create new text objects. You can change the text font and color after you have typed it.

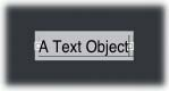
Text objects can also be rotated and have the menu's drop shadow applied.

To add a text object to a menu

1 Double-click the menu where you want to add a text object. You will be able to move the object later, so the actual position is not critical.

2 Start typing the text. As you type, the text appears on the menu, with a handle on each end. To create a new line, press the Return key, or press Enter to exit the text entry mode. The Text Object Inspector appears.

Note: You can also type the text in the Text entry area in the Text Object Inspector, and use either Return or Enter to create a new line.



3 Click the Shadow checkbox to add the menu's drop shadow to the text.

4 To change the text's justification, do one of the following:

- Click the appropriate button in the Text Object Inspector.
- Press Command–Shift–Left Bracket ([) to left align the text.
- Press Command–Shift–Right Bracket (]) to right align the text.
- Press Command-Shift-Backslash (\) to center the text.

5 Rotate the Rotation knob or enter a value to rotate the text object.

You can reposition the text object by dragging the text to a new position. (If you are in the text edit mode with the blinking insertion point showing in the Menu Editor, you need to click an empty area of the Menu Editor to exit the text edit mode before you can drag the text object to a new position.)

To change the text object's font and color

1 Select the text you want to change.

2 Do one of the following to open the Font panel:

- Choose Format > Font > Show Fonts (or press Command-T).
- Click Fonts in the toolbar.

3 Choose the font and size to use.

Note: If you open a DVD Studio Pro project that uses a font that is not on the computer you are opening it on (either because the font was deleted or the project was created on a different computer), any items using the missing font have a different font substituted with no warning.

4 Do one of the following to open the Colors window:

- Choose Format > Font > Show Colors (or press Command-Shift-C).
- Click Colors in the toolbar.

5 Choose the color to use.

You can also add bold, italic, and underline attributes to the text.

Note: The bold and italic attributes are available only if the current font supports them.

To apply bold, italic, and underline attributes

1 Select the text you want to change.

2 Choose Format > Font > Bold (or press Command-B) to add the bold attribute.

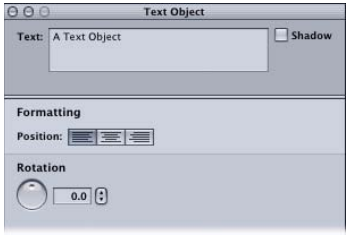
3 Choose Format > Font > Italic (or press Command-I) to add the italic attribute.

4 Choose Format > Font > Underline (or press Command-U) to add the underline attribute.

By selecting different parts of the text, you can mix different fonts, colors, and attributes in the same text object.

Setting Text Object Properties

The Text Object Inspector appears once you type text on a menu or select an existing text object. It contains basic settings for configuring the text.



- *Text:* This area contains the text displayed in the text object. You can also enter or edit the text here. To add additional lines, press Return.
- *Shadow:* Select this checkbox to apply the menu's drop shadow setting to this text object.
- *Position:* Select the justification to apply to the text object (left, center, or right).
- *Rotation:* Rotate the knob or enter a value to rotate the text object. The values can go from 0.0 to 359.9, with a value of 0.0 as normal.

About Text Objects

Any text objects you add to your menu will become part of the menu's background when the project is built.

While you should avoid overlapping buttons, you can feel free to overlap text objects because they are not involved in navigation. Because text objects can be overlapped, use care when adding them to the menu—those added later have a higher priority and will cover up those added earlier.

To change a text object's priority

- Control-click it, then choose an option from the shortcut menu. See About Button Numbers for more information.

Note: Text objects, drop zones, and buttons are included in the same priority list; a text object can have a higher priority, and thus cover up, a button or drop zone.

Adding Audio to a Menu

All menus created with the standard method, including menus with still backgrounds, can have one or more associated audio files. Adding audio to a menu can be an easy way to make it more engaging. The audio can come from files created specifically for this purpose, portions of the soundtrack, or from an audio library. The Apple audio applications Soundtrack and GarageBand are both great for creating high-quality background audio.

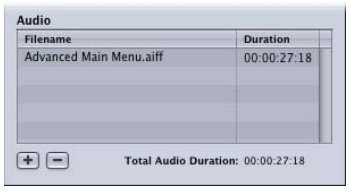
If you assign a video asset to the menu's background by dragging it to the Menu Editor, DVD Studio Pro can automatically assign its companion audio file (with the same base name and in the same folder) to the menu. The "Find matching audio when dragging" setting in the Track pane of DVD Studio Pro Preferences controls whether or not the audio is assigned. See Track Preferences for more information.

You can also manually assign an audio file to a menu.

To assign an audio file to a menu

Do one of the following:

- Drag an audio file to the Menu Editor, then choose Set Audio or Add to Existing Audio from the Drop Palette.
- Click the General tab in the Menu Inspector, then do one of the following:
  - Drag an audio file to the Audio Filename area.
  - Click the Add (+) button and select the audio file from the file selection dialog.



In addition to adding audio files to your menu, you can use the General tab in the Menu Inspector to set the order of the audio files and to remove them from the menu.

To manage the audio files assigned to a menu

Do one of the following:

- To set the order of the audio files, drag them in the file list.
- To remove audio files, select them and click the Delete (-) button.

To hear the audio

- Click the Motion button in the Menu Editor. If there is a still image as the menu's background, you can use the motion settings in the Menu Inspector's General tab to set the start and end points of the audio.

See Configuring Motion Menu Settings for information on how the audio interacts with any video clips assigned to the menu, including when looping is enabled.

Configuring the Menu's Drop Shadow Settings

Each standard menu can have a drop shadow that can be shared by button text, shapes, drop zones, and text objects. You configure the drop shadow in the Advanced tab in the Menu Inspector and then enable it in the Inspector for each button text, shape, drop zone, and text object you want it applied to.

Enabling Drop Shadows

Enabling the drop shadows on a menu is a two-step process: Enable drop shadows for each menu item you want to apply them to, and then configure the menu's drop shadow settings. This allows you to see the effect of the menu settings on all of the items at once.

To enable the drop shadow

1. Select a menu item that supports drop shadows (button text, button shapes, drop zone shapes, or text objects).
2. In that item's Inspector, click the Shadow checkbox to enable it.
3. Click an empty part of the menu in the Menu Editor so the Menu Inspector appears.
4. Click the Menu Inspector's Menu tab. The drop shadow settings appear along the bottom part of the tab.

5. Configure the drop shadow settings. (Keep in mind that the drop shadows only appear on items that have been enabled.) See Setting the Drop Shadow Properties for more information.

Setting the Drop Shadow Properties

Once you have enabled drop shadows on one or more menu items, you can start adjusting the drop shadow settings.

Note: You will not see the drop shadow if any of the settings are at 0.0.

- *Angle:* A rotary control that sets the direction of the drop shadow. The control's indicator points in the drop shadow's direction. Rotate the indicator to the desired direction. You can also enter an angle value. A value of 0 places the shadow directly above the item; 90 places it to the right.
- *Alpha:* Sets the drop shadow's transparency. A value of 0.0 makes the drop shadow completely transparent while a value of 1.0 makes it completely opaque.
- *Diffusion:* Sets the drop shadow's softness. Smaller numbers provide harder edges while larger numbers (up to a maximum of 15.0) provide softer edges.
- *Distance:* Sets the distance of the drop shadow from the item. Smaller numbers position the drop shadow closer while larger numbers (up to a maximum of 15.0) position it farther away.
- *Colored rectangle:* Sets the color of the drop shadow. Click it to open the Colors window where you can choose the color to use.

Configuring Motion Menu Settings

There are several parts of a standard menu that can include an asset with motion or a time setting:

- The menu's background
- The menu's audio
- Buttons
- Drop zones

A motion menu can have anywhere from one to all four of these motion items. The items it contains determine how they will interact.

About Motion Menu Playback

The Menu Editor contains a motion menu start/stop button.

Clicking the button starts motion menu playback. Clicking it a second time stops playback. You can also press Command-J to turn the playback on and off.

Unlike a similar button in iDVD, this button does not determine whether or not this menu is a motion menu. It only controls whether the motion menu plays while you are working on it. Once you add motion assets to a menu, it is a motion menu.

Note: Depending on your system and the number of motion items in the menu, motion menu playback may not be perfectly smooth in the Menu Editor. Once you build your project, playback will be perfect.

About the Motion Settings

The Menu Inspector's General tab contains a section for configuring a menu's start, end, loop, and duration times.

You can drag the slider located under the thumbnail images of the background, click the arrow controls, or enter a timecode value for each of the entries. The way the Start, Loop Point, End, and Duration settings function depends on the type of assets assigned to the menu.

Start Setting

You can use the Start setting to set the video's starting frame. By default, the start is set to the background video's first frame. If there is audio assigned to the menu, its start time is also moved by the same number of frames as the video.

Note: If there are other motion assets assigned to buttons or drop zones, they are not affected by the change in start time.

When the menu's background is a still image, the Start setting only affects the menu's audio.

Loop Point

You can use the Loop Point setting to set a frame different from the starting frame to use when you choose Loop as the At End setting. By default, the Loop setting is the same as the Start setting. When you adjust the Loop setting, you are choosing the frame that is jumped to once the end frame is reached. This allows you to have a looping background with a beginning section—for example, a fade up from black or a transition from another menu—that only plays the first time through. If there is audio assigned to the menu, it automatically follows the video as it loops.

This setting also defines when the button highlights appear—the viewer cannot navigate the menu's buttons until the loop point is reached. Additionally, the Loop Point setting controls the video used for the menu's tile in the Graphical tab.

If you are creating your menu background video in an application such as Motion or Final Cut Pro, you can set a chapter marker named "MenuLoopPoint" to define the loop point. When you assign a menu's background by dragging the video to the Menu Editor and choosing Set Background from the Drop Palette, or dragging the video to the Outline or Graphical tab, DVD Studio Pro checks to see if a chapter marker named "MenuLoopPoint" is present. If it is, the Loop Point setting is set to its time. If it is not present, the Loop Point setting is set to match the Start setting.

Note: When you assign the menu's background using the Menu Inspector's Background pop-up menu, you must manually set the Loop Point setting, even if the video contains a "MenuLoopPoint" chapter marker.

See Defining the Menu Loop Point for more information on setting the chapter markers.

About Jumping Directly to a Menu's Loop Point

When you configure a motion menu with a loop point, you may find that, in some cases, you would prefer to jump directly to the loop point rather than to the start point. This is especially true if the menu has a long period between the start and loop points.

You can write a simple script that will allow you to jump to the loop point. When you select Jump as the command in the Script Inspector and choose a menu to jump to, a Start At Loop Point option becomes available. When selected, this option sets the jump to skip the start point and jump directly to the loop point. See Start At Loop Point Checkbox for more information, and Jumping to a Menu's Loop Point for an example script.

End Setting

You can use the End setting to set the menu's ending frame. By default, this is set to the value entered in the Menu pane in DVD Studio Pro Preferences if the menu has any motion assets. You can adjust it to be shorter or longer. This is most useful when you do not want to use the entire video background asset—when used along with the Start setting, you can choose the specific part of the video to use.

- *When using the slider:* Its maximum setting matches the length of the menu's background video. If the background is a still image, the slider maximum setting matches the longest of the other menu assets (audio or assets assigned to buttons and drop zones).
- *When using the numeric timecode entry:* You are able to choose any length.

When the end is reached during playback, either all assets stop and display their last frame as a still image (At End set to Still), or the playback jumps to the Loop, if available, or Start setting.

If any assets assigned to the menu reach their end before the menu reaches the End setting, they are looped back to their start to keep playing.

Duration Setting

You can use the Duration setting to set the menu's duration. It is equal to the End setting minus the Start setting. If you enter a value, the End setting automatically updates.

Options in the Drop Palette for Standard Menus

Following are descriptions of the various Drop Palette options that can appear when you drag an asset or element to the Menu Editor. See Viewing the Drop Palette for information on using the Drop Palette options.

The following descriptions are grouped by the type of item you are dragging (asset, project element such as a track or slideshow, and a template, style, or shape from the Palette). Details for standard menus are listed first, followed by the details for the layered menus.

For those Drop Palette options that appear when you drag a motion video asset, a matching audio asset is also added (if applicable), as long as:

- The "Find matching audio when dragging" setting in the Track pane of DVD Studio Pro Preferences is selected.
- An audio file with the same base name as the video file is located in the same folder as the video asset.

The following details assume the "Find matching audio when dragging" preference is selected and a suitable audio file is found.

Drop Palette for Standard Menus—Dragging Assets

The following sections list the choices in the Drop Palette that appear when you drag assets to an empty area, button, or drop zone on a standard menu.

Dragging a Motion Video Asset to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Background (default option)	• Uses the video as this menu's background. • Assigns matching audio as the menu's audio.
Create Button and Track	• Creates a button at this menu location. • Assigns this video to the button's thumbnail. • Creates a new track with this video. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Adds a link from the new button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.
Create Button	This option does not create a track or link the button to anything. • Creates a button at this menu location. • Assigns this video to the button's thumbnail, creating a motion button.
Create Drop Zone	• Creates a drop zone at this menu location. • Assigns this video to the drop zone.
Create Button and Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. If the menu contains no buttons, drop zones, or text objects, this option changes to Create Chapter Index. Instead of creating a separate menu as the first chapter index menu, this menu is used. Additional chapter index menus are created if necessary. • Creates a track and adds the chapter markers to it. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Creates a button on this menu to link to the first of the new chapter index menus. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons in the chapter index menus. • Assigns the video from each marker to its button's thumbnail.

Dragging a Motion Video Asset to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset (default option)	This option does not create a track or link the button to anything. • Sets this video to be the button's thumbnail image.

Drop Palette options	Actions
Set Asset and Create Track	• Assigns this video to the button's thumbnail. • Creates a new track with this video. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Adds a link from the button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.
Create Track	The button's thumbnail image does not change. • Creates a new track with this video. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Adds a link from the button to the first marker of the new track.
Set Asset and Create Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. • Creates a track and adds the chapter markers to it. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Links the button to the first of the new chapter index menus. • Sets this video to be the button's thumbnail image. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons in the chapter index menus. • Assigns the video from each marker to its button's thumbnail.
Create Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. • Creates a track and adds the chapter markers to it. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Links the button to the first of the new chapter index menus. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons in the chapter index menus. • Assigns the video from each marker to its button's thumbnail.

Dragging a Motion Video Asset to a Drop Zone

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset (default option)	• Sets this video to be the drop zone's asset.
Create Button and Track	The drop zone is unaffected. • Creates a button on top of the drop zone. • Assigns this video to the button's thumbnail. • Creates a new track with this video. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Adds a link from the new button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.

Dragging Multiple Motion Video Assets to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Buttons and Tracks (default option)	For each video asset: • Creates a button. • Assigns each video as its button's asset. • Creates new tracks. • Assigns matching audio as each track's audio. • Names each track the same as their video asset. • Sets each new track's End Jump setting to this menu. • Adds links from the new buttons to the first marker of the new tracks.
Create Buttons	This option does not create any tracks or link the buttons to anything. • Creates a button for each video asset. • Assigns each video as its button's asset.

Dragging One or More Audio Assets to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Audio (default option)	• Assigns this audio as the menu's audio.
Add to Existing Audio	• Adds this audio to the existing audio assets assigned to this menu.

Dragging a Video/Audio Pair to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Background and Audio (default option)	• Sets this video to be the menu's background. • Sets this audio to be the menu's audio.
Create Button and Track	• Creates a button at this menu location. • Assigns this video to the button's thumbnail. • Creates a new track with this video and audio. • Names the track the same as the video asset. • Adds a link from the new button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.
Create Button and Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. If the menu contains no buttons, drop zones, or text objects, this option changes to Create Chapter Index. Instead of creating a separate menu as the first chapter index menu, this menu is used. Additional chapter index menus are created if necessary. • Creates a track and adds the chapter markers and audio to it. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Creates a button on this menu to link to the first of the new chapter index menus. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons in the chapter index menus. • Assigns the video from each marker to its button's thumbnail.

Dragging a Video/Audio Pair to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset and Create Track (default option)	• Sets this video to be the button's thumbnail image. • Creates a new track with this video and audio. • Names the track the same as the video asset. • Adds a link from the button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.
Create Track	The button's thumbnail does not change. • Creates a new track with this video. • Names the track the same as the video asset. • Adds a link from the button to the first marker of the new track.

Drop Palette options	Actions
Set Asset and Create Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. • Creates a track and adds the chapter markers and audio to it. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Links the button to the first of the new chapter index menus. • Sets this video to be the button's thumbnail image. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons in the chapter index menus. • Assigns the video from each marker to its button's thumbnail.
Create Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. • Creates a track and adds the chapter markers and audio to it. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Links the button to the first of the new chapter index menus. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons in the chapter index menus. • Assigns the video from each marker to its button's thumbnail.

Dragging a Still Picture to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Background (default option)	• Uses the picture as this menu's background.
Set Overlay	• Uses the picture as this menu's overlay.
Create Button	This option does not create a new menu or link the button to anything. • Creates a button at this menu location and assigns this picture to its thumbnail.

Drop Palette options	Actions
Create Drop Zone	• Creates a drop zone at this menu location and assigns this picture to it.
Create Submenu	• Creates a button at this menu location. • Assigns this picture to the button's thumbnail. • Creates a new menu with this picture as the background. • Adds a link from the new button to the new menu.

Dragging a Still Picture to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset (default option)	This option does not create a menu or link the button to anything. • Sets this picture to be the button's thumbnail image.
Set Asset and Create Submenu	• Sets this picture to be the button's thumbnail image. • Creates a new menu with this picture as the background. • Adds a link from the button to the new menu.
Create Submenu	The button's thumbnail does not change. • Creates a new menu with this picture as the background. • Adds a link from the new button to the new menu.

Dragging a Still Picture to a Drop Zone

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset (default option)	• Sets this picture to be the drop zone's asset.
Create Button	This option does not create a new menu or link the button to anything. The drop zone is unaffected. • Creates a button on top of the drop zone and assigns this picture to its thumbnail.

Dragging Multiple Still Pictures (or a Folder) to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button and Slideshow (default option)	This is the only action available if you drag a folder to an empty area (uses only the still pictures of the folder's first level). • Creates a button with the first picture assigned as its thumbnail image. • Creates a new slideshow. • Adds a link from the new button to the new slideshow. • Sets the slideshow's End Jump setting to this menu.

Drop Palette options	Actions
Create Buttons	This option does not create any menus or link the buttons to anything. • Creates a button for each picture, and assigns each picture as its thumbnail.
Create Submenus	• Creates a button for each picture. • Assigns each picture as its button's asset. • Creates new menus with each picture as their backgrounds. • Adds a link from the new buttons to the new menus.

Dragging Multiple Still Pictures (or a Folder) to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset and Create Slideshow (default option)	• Sets the button's thumbnail to the first picture. • Creates a new slideshow. • Adds a link from the button to the new slideshow. • Sets the slideshow's End Jump setting to this menu.
Create Slideshow	The button's thumbnail image does not change. • Creates a new slideshow. • Adds a link from the button to the new slideshow. • Sets the slideshow's End Jump setting to this menu.

Dragging a Multiple-Layer Still Picture to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Background—All Layers Visible (default option)	Once set, you can disable layers in the Menu Inspector. • Uses the picture as this menu's background, with all layers visible.
Set Background—No Layers Visible	Once set, you can enable layers in the Menu Inspector. • Uses the picture as this menu's background, with no layers visible.
Set Overlay	Once set, you can select the layer to use as the overlay in the Menu Inspector. • Uses the picture as this menu's overlay, with no layers assigned to the overlay.
Create Button	This option does not create a new menu or link the button to anything. You cannot select the layers to show—because they are composited together. • Creates a button at this menu location and assigns this picture to its thumbnail, using the layers left visible by the graphics application.

Drop Palette options	Actions
Create Standard Submenu	Once set, you can disable layers for the new menu in the Menu Inspector. • Creates a button at this menu location. • Assigns this picture to the button's thumbnail, using the layers left visible by the graphics application. • Creates a new standard menu with this picture as the background, with all layers visible. • Adds a link from the new button to the new menu.
Create Layered Submenu	Once set, you can disable layers for the new menu in the Menu Inspector. • Creates a button at this menu location. • Assigns this picture to the button's thumbnail, using the layers left visible by the graphics application. • Creates a new layered menu with this picture as the background, with all layers visible. • Adds a link from the new button to the new menu.

Drop Palette for Standard Menus—Dragging Project Elements

The following sections list the choices in the Drop Palette that appear when you drag project elements from the Outline or Graphical tab to an empty area or a button on a standard menu.

Dragging an Existing Track to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Assigns the video from the first video clip of stream 1 to the new button's thumbnail. • Adds a link from the new button to the first marker of the track. • Sets the track's End Jump setting to this menu (if it has not already been set).
Create Button and Chapter Index	If the menu contains no buttons, drop zones, or text objects, this option changes to Create Chapter Index. Instead of creating a separate menu as the first chapter index menu, this menu is used. Additional chapter index menus are created if necessary. • Creates a button on this menu to link to the first of the new chapter index menus. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the track to buttons on the chapter index menus. • Assigns the video from each marker to its button's thumbnail. • Sets the track's End Jump setting to this menu (if it has not already been set).

Dragging an Existing Track to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset (default option)	• Sets the video from the first video clip of stream 1 to be the button's thumbnail image. • Adds a link from the button to the first marker of the track. • Sets the track's End Jump setting to this menu (if it has not already been set).
Connect to Track	The button's thumbnail does not change. • Adds a link from the button to the first marker of the track. • Sets the track's End Jump setting to this menu (if it has not already been set).

Drop Palette options	Actions
Set Asset and Create Chapter Index	• Links the button to the first of the new chapter index menus. • Sets this track to be the button's thumbnail image. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the track to buttons on the chapter index menus. • Assigns the video from each marker to its button's thumbnail. • Sets the track's End Jump setting to this menu (if it has not already been set).
Create Chapter Index	• Links the button to the first of the new chapter index menus. • Creates one or more new chapter index menus, depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the track to buttons on the chapter index menus. • Assigns the video from each marker to its button's thumbnail. • Sets the track's End Jump setting to this menu (if it has not already been set).

Dragging Multiple Existing Tracks to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Buttons (default option)	• For each track, creates a button. • Assigns each track as its button's asset. • Adds a link from the new buttons to the first marker of the tracks. • Sets each track's End Jump setting to this menu (if it has not already been set).

Dragging an Existing Story to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Assigns the video from the story's first video clip to the new button's thumbnail. • Adds a link from the new button to the story's first video clip. • Sets the story's End Jump setting to this menu (if it has not already been set).

Dragging an Existing Story to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset (default option)	• Sets the video from the story's first video clip to be the button's thumbnail image. • Adds a link from the button to the story's first video clip. • Sets the story's End Jump setting to this menu (if it has not already been set).
Connect to Story	The button's thumbnail does not change. • Adds a link from the button to the story's first video clip. • Sets the story's End Jump setting to this menu (if it has not already been set).

Dragging Multiple Existing Stories to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Buttons (default option)	• For each story, creates a button. • Assigns each story as its button's asset. • Adds a link from the new buttons to each story's first video clip. • Sets each story's End Jump setting to this menu (if it has not already been set).

Dragging a Slideshow to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Assigns the first slide to its thumbnail. • Adds a link from the new button to the slideshow. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).
Create Button and Chapter Index	If the menu contains no buttons, drop zones, or text objects, this option changes to Create Chapter Index. Instead of creating a separate menu as the first chapter index menu, this menu is used. Additional chapter index menus are created if necessary. • Creates a button on this menu to link to the first of the new chapter index menus. • Creates one or more new chapter index menus, depending on the number of slides and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each slide from the slideshow to buttons in the chapter index menus. • Assigns the picture from each slide to its button's thumbnail. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).

Dragging a Slideshow to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset (default option)	• Sets the first slide's image to be the button's thumbnail. • Adds a link from the button to the slideshow. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).
Connect to Slideshow	The button's thumbnail does not change. • Adds a link from the button to the slideshow. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).
Create Chapter Index	• Links the button to the first of the new chapter index menus. • Creates one or more new chapter index menus, depending on the number of slides and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each slide from the slideshow to buttons in the chapter index menus. • Assigns the picture from each slide to its button's thumbnail. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).

Dragging Multiple Slideshows to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Buttons (default option)	• Creates a button for each slideshow. • Assigns each slideshow as its button's asset. • Adds a link from the new buttons to the slideshows. • Sets each slideshow's End Jump setting to this menu (if they have not already been set).

Dragging a Menu to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Assigns the menu's background as the button's thumbnail. • Adds a link from the new button to the menu.

Dragging a Menu to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Asset (default option)	• Sets the menu's background to be the button's thumbnail. • Adds a link from the button to the menu.
Connect to Menu	• Adds a link from the button to the menu. The button's thumbnail does not change.

Dragging a Script to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Adds a link from the new button to the script.

Dragging a Script to a Button

The following option appears in the Drop Palette:

Drop Palette options	Actions
Connect to Script (default option)	• Adds a link from the button to the script.

Drop Palette for Standard Menus—Dragging Templates and Styles

The following sections list the choices in the Drop Palette that appear when you drag shapes, templates, and styles from the Palette to an empty area or a button on a standard menu.

Dragging a Shape to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Assigns this shape to the button.
Create Drop Zone	• Creates a drop zone at this menu location. • Assigns this shape to the drop zone.

Dragging a Shape to a Button or Drop Zone

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Shape (default option)	• Assigns this shape to the button or drop zone.
Create Button	Only available when dragging to a drop zone. The drop zone is unaffected. • Creates a button on top of the drop zone. • Assigns this shape to the button.

Dragging a Template to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Apply to Menu (default option)	• Template buttons are only applied to existing buttons (no new buttons are created). An exception is if the menu has no buttons, in which case all buttons from the template will be added.
Apply to Menu—Add All Buttons	• Template buttons are all applied, replacing existing buttons and adding new ones (if necessary).
Create Submenu	• Creates a button at this menu location. • Assigns this template's background to the button's thumbnail. • Creates a new standard menu with this template. • Adds a link from the new button to the new menu.

Dragging a Template to a Button

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Submenu and Apply Template (default option)	• Creates a new standard menu with this template. • Adds a link from the button to the new menu.

Dragging a Button Style to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Assigns this style to the button.
Create Button—Set Default Button Style	• Creates a button at this menu location. • Assigns this style to the button. • Assigns this style as the default button style for this menu.
Set Default Button Style	No button is created. • Assigns this style as the default button style for this menu.

Dragging a Button Style to a Button

The following option appears in the Drop Palette:

Drop Palette options	Actions
Apply to Button (default option)	• Applies this button style to the button.

Dragging a Text Style to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Text Object (default option)	• Creates a text object at this menu location. • Assigns this style to the text object.
Create Text Object—Set Default Text Style	• Creates a text object at this menu location. • Assigns this style to the text object. • Assigns this style as the default text style for this menu.
Set Default Text Style	No text object is created. • Assigns this style as the default text style for this menu.

Dragging a Text Style to a Text Object

The following option appears in the Drop Palette:

Drop Palette options	Actions
Apply to Text Object (default option)	• Assigns this style to the text object.

Dragging a Drop Zone Style to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Drop Zone (default option)	• Creates a drop zone at this menu location. • Assigns this style to the drop zone.

Dragging a Drop Zone Style to a Drop Zone

The following option appears in the Drop Palette:

Drop Palette options	Actions
Apply to Drop Zone (default option)	• Assigns this style to the drop zone.

Dragging a Layout Style to the Menu Editor

The following options appear in the Drop Palette:

Drop Palette options	Actions
Apply to Menu (default option)	• Layout style buttons are only applied to existing buttons (no new buttons are created). An exception is if the menu has no buttons, in which case all buttons from the layout style will be added.
Apply to Menu—Add All Buttons	• Layout style buttons are all applied, replacing existing buttons and adding new ones (if necessary).

Using Templates, Styles, and Shapes to Create Your Menus

14

DVD Studio Pro includes templates and styles that can make it easier to create menus. You can use the supplied templates and styles to quickly produce your menus, or you can make your own templates and styles.

This chapter covers the following:

- Introduction to Templates, Styles, and Shapes (p. 313)
- What Are Templates and Styles? (p. 314)
- Templates and Styles in the Palette (p. 316)
- Applying a Template or Style (p. 321)
- Setting Default Styles (p. 323)
- Creating a Template or Style (p. 324)
- Importing Templates and Styles (p. 326)
- Deleting Templates and Styles (p. 327)
- Managing Shapes (p. 329)

Introduction to Templates, Styles, and Shapes

DVD Studio Pro includes templates and styles that are designed to make the menu creation process quicker and easier. By applying a template or style to all menus in a project, you can create a cohesive, consistent look for your project.

- You can use the supplied templates and styles to create your menus. Use a template to supply everything needed for a menu, or choose certain styles to use in combination with menus you create.
- You can create your own templates and styles. This makes it easy to create a consistent look to apply to all of your menus that meets your specific needs.

DVD Studio Pro also includes a shapes feature that allows you to add buttons to your menu that include the art and highlight areas. The shapes can also be used to create drop zones with irregular edges. See Managing Shapes for more information.

What Are Templates and Styles?

Templates and styles both contain properties, such as background assets, button highlights, and text colors, that you use to create a menu. While templates cover all aspects of a menu, styles are targeted to specific areas. Applying a template to a menu can result in a mostly finished menu—you may only need to link the buttons. With styles, you generally work with an existing menu, and then use the styles to change specific areas such as a button's shape or a text object's font.

In addition to the supplied templates and styles, you can create your own. You can import and use these templates and styles in many different projects.

Each template and style can be self-contained, including the actual assets used in the template or style, such as backgrounds, audio files, and shapes. Or, they can reference assets located in a folder on your hard disk.

Note: Templates and styles are in either PAL or NTSC format. You cannot use a template or style created using NTSC assets in a PAL project. The Palette only shows templates and styles that are compatible with the current project's video standard. Additionally, templates using HD-specific resolutions (such as 1280 x 720p) or HD-specific video formats (HDV or H.264) cannot be imported into SD projects.

About the Apple Templates

Using the templates and styles provided with DVD Studio Pro is the quickest way to create professional looking menus. They can also help you to understand the different aspects of a template and give you ideas on how to create your own. Also, keep in mind that the Apple templates can be modified and saved as user templates.

The Apple templates are installed when you install Final Cut Studio. If you chose not to install them, you can install them later by starting the Final Cut Studio install process and deselecting everything except the DVD Studio Pro content. See the *Installing Your Software* document included with Final Cut Studio for more information.

In general, each template theme includes three templates designed for use in different situations:

- *Cover:* Use these as the main menu. These include a text item for the menu title, one or more drop zones for you to customize their look, and several buttons that you can link to other menus and project elements.
- *Detail:* Use these when you need to have a menu with several lines of explanation-type text. These include a text item for the menu title, one or more drop zones for you to customize their look, and several buttons.
- *Index:* Use these for chapter index menus. These include a text item for the menu title, multiple buttons for linking to a track's chapters, and three buttons, Back, Main, and Next, that the viewer uses to navigate to the next element.

The best way to learn what a template contains is to apply it to a menu and look for button, drop zone, and text items. Any menu item that you can assign an image to has a transparent arrowhead assigned by default.

These arrows indicate menu items you can assign images to.

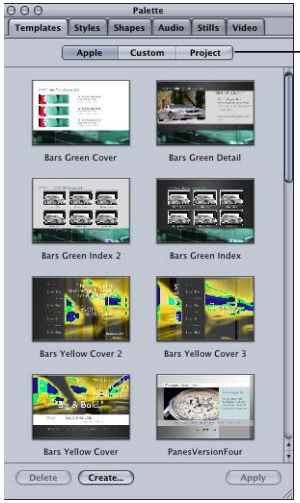
Most of the templates contain motion backgrounds—be sure to have the menu play in the Menu Editor to see how it is intended to look.

About the Template Intro Movies

The Final Cut Studio installation disc includes several video assets that are intended to be used as menu intro files for specific supplied templates. These assets can be used to provide a smooth transition when a menu is selected that uses the associated template. See the "About Template Intro Movies" file, located in the Template Intro Movies folder on the installation disc for more information. Also see Using Menu Intro Clips.

Templates and Styles in the Palette

Templates and styles are contained in the Palette's first two tabs.



Click to select the group of templates or styles to display.

See Managing Shapes for information on the Shapes tab, and Media Tabs for information on the Audio, Stills, and Video tabs.

You can choose either small or large as the size for the thumbnails that appear in the Palette in the General pane of DVD Studio Pro Preferences. See General Preferences for more information on the preferences.

Template and Style Groups

To see the available templates and styles, you click the buttons at the top of the tabs. There are three choices for templates and four for styles:

- *Apple:* The templates and styles provided by DVD Studio Pro. These are available to all projects.
- *Custom:* The templates and styles you create and do not designate as "Project." These are available to all projects.
- *Project:* The templates and styles you create for use only in a specific project. These do not appear when you are working on other projects.

  Note: You must have saved your project before you can create a template or style belonging to the project group.
- *Current:* For styles only, these are the styles that have been linked to the template assigned to the current menu. See Linking Styles to Templates for more information.

Style Types

In addition to the style group you select, when you click the Styles tab in the Palette, you also need to select the type of style.

Click to select the style type to display.

There are four style types you can choose from:

- *Buttons:* Contains almost all settings (except navigation and jump settings) from the Button Inspector.
- *Text:* Contains the font, size, color, rotation, and default text.
- *Drop Zones:* Contains details about drop zones.
- *Layouts:* Contains locations, sizes, shapes, and other attributes of one or more buttons on a menu.

Linking Styles to Templates

You can link, or associate, styles to templates. That way, if you apply a template to a menu and then want to use a different button style on one of the buttons, you can choose to see only those button styles that have been linked to that template. This makes it easier to create menus based on families of templates and styles, helping you maintain a consistent look while creating a project.

Once you have applied a template to a menu, you can see which styles are linked to that template by selecting the Current view in the Styles tab in the Palette. When you select a style type (buttons, text, layouts, or drop zones), only the styles linked to that menu appear.

Note: You can only link the styles you create to templates. The supplied Apple styles are already linked to the Apple templates.

To link a style to a template

1 Control-click a style, then choose Link to Templates from the shortcut menu.

A selection dialog that lists all templates appears.

2 Select the checkbox next to all templates that you want to link this style to.

Because menus keep track of the last template applied to them, you can open a menu at any time and, by selecting the Current view in the Styles tab, see those styles linked to the menu's template.

Note: If no template is applied to the menu, or no styles have been linked to the template, no styles appear when the Current view is selected.

About Template and Style Properties

Properties define the look and content of templates and styles. For example, properties define what kind of menu background a template has, how many buttons a layout style has, and where the buttons are located on the menu. Not all templates and styles need to use all of the properties available to them. For example, you can create a set of templates that have no menu background—when they are applied to an existing menu, the menu's current background is maintained while other template properties, such as groups of buttons and text objects, are added to the menu.

A template contains the properties of each of the four styles plus some additional properties. See the following sections for details:

- Button Style Properties
- Text Style Properties
- Drop Zone Style Properties
- Layout Style Properties
- Other Template Properties

Button Style Properties

Button styles and all buttons in a template contain the following properties. Templates also contain the following properties as the default button style, used when a Drop Palette action requires new buttons to be created on the menu. See Setting Default Styles for information on setting a default button style.

- *Size:* The width and height of the button's active area

- *Asset:* The asset file assigned to the button and the timecode setting below the thumbnail. When a button style is applied to an existing button, this asset only appears if the existing button does not already have an asset assigned.
- *Motion:* Whether or not motion has been enabled for the asset
- *Shape:* The shape file assigned to the button
- *Shadow:* Whether or not the menu's drop shadow has been enabled for the shape
- *Color Set:* Which of the three highlight sets the button uses
- *Auto Action:* Whether or not Auto Action has been enabled for the button
- *Invisible:* Whether or not the button has been set to be invisible
- *Default Text:* The actual text that the button uses. When a button style is applied to an existing button, this text only appears if the existing button does not already have text.
- *Font:* The font's name and size used for the button text
- *Text Color:* The text's color
- *Text Position:* The text's position on the button (top, left, right, center, or bottom)
- *Text Offset:* The offset values for the text's position
- *Text Shadow:* Whether or not the menu's drop shadow has been enabled for the text
- *Text in Highlight:* Whether or not the text is included in the button's highlight

Text Style Properties

Text styles and all text objects in a template contain the following properties. Templates also contain the following properties as the default text style, used when you double-click the menu background to create a text object. See Setting Default Styles for information on setting a default text style.

- *Default Text:* The actual text that the text object uses. This text does not appear when a text style is applied to an existing text object.
- *Font:* The font's name and size used for the text object
- *Text Color:* The text's color
- *Rotation:* The rotation setting used for the text object

Drop Zone Style Properties

Drop zone styles contain the following properties. Templates contain the following properties for each of their drop zones.

- *Size:* The width and height of the drop zone's active area
- *Asset:* The asset file assigned to the drop zone and the timecode setting below the thumbnail. When a drop zone style is applied to an existing drop zone, this asset only appears if the existing drop zone does not already have an asset assigned.
- *Shape:* The shape file assigned to the drop zone

- *Shadow:* Whether or not the menu's drop shadow has been enabled for the drop zone
- *Rotation:* The rotation setting used for the drop zone
- *Motion:* Whether or not motion has been enabled for the asset

Layout Style Properties

Layout styles and templates contain the following properties.

- *Position/Size:* The position and size of all buttons in the layout
- *Button Assets:* The assets assigned to the buttons. This asset does not appear when a layout style is applied to a menu with buttons already containing assets. This asset only appears if the existing buttons do not already have an asset assigned.
- *Button Shapes:* The shapes assigned to the buttons
- *Button Text:* The text assigned to the buttons. This text does not appear when a layout style is applied to a menu with buttons already containing text. This text only appears if the existing buttons do not already have text assigned.
- *Default Button:* The button number of the button assigned as the default button. This is the button selected when the menu appears, unless the connection to the menu specified a different button.
- *Guides:* The guide configuration, including the number of guides and their positions

Other Template Properties

In addition to the button, text, drop zone, and layout style properties, templates contain the following properties:

- *Default Button Style:* The default button style is used when a Drop Palette action requires new buttons to be created on the menu. See Setting Default Styles for information on setting a default button style.
- *Default Text Style:* The default text style is used when you double-click the menu background to create a text object. See Setting Default Styles for information on setting a default text style.
- *Background Asset:* The name of the asset assigned to the menu as the background
- *Overlay:* The name of the asset assigned to the menu as the subpicture overlay
- *Audio Asset:* The name of the audio asset assigned to the menu
- *Drop Zones:* All drop zones added to the menu. Each drop zone includes its own settings.
- *Text Objects:* All text objects added to the menu. Each text object includes its own settings.
- *Color:* The color mapping settings for the menu. These include the color and opacity assigned to each button state for each of the three color sets, as well as the Color Palette's 16 colors.
- *Mapping Type:* Whether the menu uses the chroma or grayscale mapping type

- *Motion:* The timecode values for the start, loop point, end, and duration settings, as well as the action for the menu's end
- *Shadow:* The drop shadow settings that the buttons, text objects, and drop zones can use
- *Display Mode:* Whether the menu uses a 4:3,16:9 Pan-Scan, 16:9 Letterbox, or 16:9 Pan-Scan & Letterbox display mode
- *Resolution:* The video resolution of the video background
- *Transitions:* All transitions assigned to the menu and its buttons

Applying a Template or Style

When you select a template or style in the Palette, it does not affect the menu until you click the Apply button. Before you click Apply, it is important to make sure that the Menu Editor is displaying the correct menu, and in the case of some of the styles, that the correct items in that menu are selected.

Note: The Menu Editor always has a menu assigned to it, and it is that menu that templates and styles are applied to. Templates and styles can be applied to a menu even if you are working on a different element, such as a track. The Menu Editor does not even have to be visible.

You do not need to select anything in the menu before applying templates or layout styles. These items can be applied to an existing menu or a new empty one.

Important: Applying a template to a menu changes the menu's resolution and display mode to match the template (if they are different). Applying layout styles (or any of the other styles) does not change the menu's resolution or display mode. In the case of layout styles, the layout is scaled to match the menu's current resolution.

For the button, text, and drop zone styles, you can either select one or more items in an existing menu before applying the style, or you can drag the style to an item. Styles are applied only to selected items in an existing menu, so you can actually use multiple versions of these styles on a single menu. For example, if you want the buttons on a menu to use different shapes, you can set up several different styles to provide those shapes.

Note: Applying a template or style to a menu is a one-time action—the menu does not become locked to the template or style. You can make changes to the menu just as if you had manually configured it.

Using the Palette's Apply Button

The Palette includes an Apply button that you can use to apply the selected template or style to a menu. When applying button, text, or drop zone styles using the Apply button, the style is applied to all selected items at once. When dragging, you can only apply the style to one item.

To apply a template or style using the Apply button

1. Make sure the Menu Editor is displaying the correct menu.
2. In the case of the button, text, and drop zone styles, select the item on the menu to apply the style to.
3. Select the template or style to apply to the menu.
4. Click Apply.

The Apply button is unavailable if more than one template or style is selected. You can also apply a template or style by double-clicking it.

Dragging Templates and Styles to a Menu

In addition to the Palette's Apply button, you can apply templates and styles by dragging them to the menu. The Menu Editor's Drop Palette appears when you drag templates and styles to it. The Drop Palette provides options not available when using the Apply button. For example, you can drag a button style to an empty area of the Menu Editor and create a new button with it. With the Apply button, you need to select an existing button before the style can be applied.

The area to which you drag the template or style determines the options available to you. For example, if you drag a template to an empty part of the menu, you have the options of applying it to the menu, applying it to the menu and adding all buttons, and creating a submenu. If you drag a template to an existing button, your only option is to create a submenu and apply this template to it. See Drop Palette for Standard Menus—Dragging Templates and Styles for a complete list of options.

To apply a template or style by dragging

1. Make sure the Menu Editor is displaying the correct menu.
2. Select the template or style to apply to the menu and drag it to the Menu Editor. Be sure to drag it to an empty area or to an existing item, depending on how you want to apply the template or style.

If you select more than one item before dragging, only the item you actually drag gets applied to the menu—the others are ignored.

Applying Templates or Layout Styles to a Menu with Buttons

When you apply a template or layout style to a menu that already has buttons, you are given the option of adding only enough buttons to replace the existing ones, or of adding all template or layout style buttons. If the menu has more buttons than the template or layout style, all buttons are added with the extra ones on the menu remaining unchanged.

When replacing existing buttons, DVD Studio Pro first looks at their names to see if they match the names of any buttons in the template or layout. If an existing button and a new button have the same name, the link and asset of the original button are copied to the new button. By carefully naming your buttons, you can apply one template after another to a menu and still maintain the original button settings.

To be able to switch templates easily while using the templates and layout styles supplied with DVD Studio Pro, you need to name the buttons on your menus according to the button-naming convention used by DVD Studio Pro.

In the Apple templates and layout styles provided with DVD Studio Pro, button names fall into two categories: general-purpose buttons and special-purpose buttons.

General-Purpose Buttons

General-purpose buttons use the DVD Studio Pro default naming structure for buttons, starting with "Button 1."

Additionally, the Apple templates and layout styles can have assets and text assigned to each of the general-purpose buttons. When you create a chapter index menu, DVD Studio Pro checks each button to see if it has an asset assigned—if it does, the asset is changed to match the marker's video. Similarly, if the button has text assigned, it is replaced with each marker's name.

Special-Purpose Buttons

Any buttons not intended to link to chapter markers have underscores before and after their names—this causes DVD Studio Pro to ignore them when assigning chapter markers to buttons. The Apple templates and layout styles include three of these: _NEXT_ (to link to the next chapter index menu), _PREV_ (to link to the previous chapter index menu), and _UP_ to link to the original menu (if applicable). These three buttons automatically link to the appropriate menus when used to create a chapter index menu.

See About Chapter Index Menus for more information on chapter index menus.

Setting Default Styles

You can set a default button and text style for each menu. Additionally, you can choose a default text style for the entire project in DVD Studio Pro Preferences.

DVD Studio Pro uses the default button style any time you create a button, whether by dragging the pointer in the Menu Editor or dragging an asset to the Menu Editor and choosing an option from the Drop Palette that creates buttons.

The default text style is used whenever you add a text object to any menu in a project. You can also set a default text style for each menu. The text style includes the font, its size, and its color. It can also include default text.

You can set the default button and text styles by dragging the style to the Menu Editor or using shortcut menus.

Important: Setting the default button or text style for a menu only affects that menu—each menu has its own default button and text style settings.

To set a button or text style as the menu default by dragging

1. Select a button or text style in the Palette and drag it to the Menu Editor.
2. When the Drop Palette appears, choose Set Default Button (or Text) Style.

To set a button or text object as the menu default in the Palette

- In the Palette, Control-click the button or text object you want to use as the default, then choose Set as Default from the shortcut menu.

To set a button or text object as the menu default in the Menu Editor

- In the Menu Editor, Control-click the button or text object you want to use as the default, then choose Set as Default from the shortcut menu.

Additionally, you can set the default button and text styles for a menu when you apply a template.

See Setting DVD Studio Pro Preferences for information on setting a default text style in DVD Studio Pro Preferences.

Creating a Template or Style

While creating a template or style is not difficult, it is worth spending some planning time so that you can make the templates and styles as useful as possible.

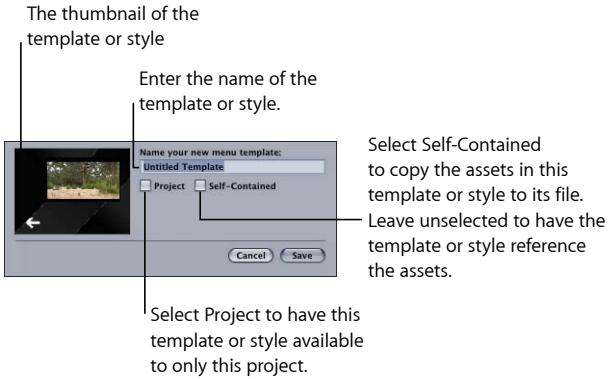
To create a template or style

1. Configure a standard menu to match what you want the template or style to be. If you're creating a template or a layout style, use care to name the buttons and create them in the correct order. See About Button Numbers and Applying Templates or Layout Styles to a Menu with Buttons for details.
2. If you're creating a button, text, or drop zone style, select the specific item on the menu whose settings you want to include in the style. For templates and layout styles, you do not need to select anything on the menu.

3 Do one of the following:

- Choose Project > Create in Menu > Template or Project > Create in Menu > Style.
- Click Create in the Palette.

The Create Template or Create Style dialog opens.



4 Enter a name for the template or style.

5 Select the Project checkbox if you want the template or style to be available only to this project. Leaving this unselected makes this template or style available to all projects on this system.

6 Select the Self-Contained checkbox to copy the assets used by this template or style into its file. This makes it easier to copy the file to another system where it can be imported by another project.

7 Click Save.

The template or style is now saved and appears in the Palette.

About Self-Contained Templates and Styles

A template or style can use a surprising number of assets. Motion backgrounds and assets assigned to the button thumbnails can be very large files. In many cases, templates and styles you create that use motion assets will be specific to a particular project. In these cases, there is no reason to save them as self-contained.

If you are creating a template or style and want to be sure it will always have the assets it requires, you can save it as self-contained. In this case, the assets are added to the template or style's file. This makes it possible to copy the file to a different system and still have a working version of it. The drawback is that the file may be very large.

Locations of Template and Style Files

Template and style files are placed in different locations based on whether or not they are project-exclusive. When you import template and style files, they are also copied to these locations.

Custom Template and Style Files

When you save a template that is not specific to a project, it is placed at the root of your disk, in this location: /Library/Application Support/DVD Studio Pro/Templates. All template files have a ".dsptemplate" extension.

Style files are placed at the same location, in a Styles folder: /Library/Application Support/DVD Studio Pro/Styles. All style files have a ".dspstyle" extension, regardless of the type of style they are. To avoid confusion, be sure to indicate the style type when naming your style.

Project Template and Style Files

When you save a project template or style, it is added to the project bundle file (the file created when you save your project). Project templates and styles cannot be shared with other projects or systems. If you want to share them, you can add a menu to your project, apply the template or style to it, and then create a new template or style from the menu, setting it so that it is not specific to the project. This creates a new template or style file in the folders mentioned above.

Apple Template and Style Files

The Apple template and style files provided with DVD Studio Pro are at /Library/Application Support/Final Cut Studio/DVD Studio Pro/. Because these are the same for all DVD Studio Pro systems, there is no reason to copy these to another system.

Naming Buttons in Your Templates and Styles

If you create a template or layout style, you should follow a consistent button-naming convention. This will allow you to apply different templates or styles, one after the other, without having to reconfigure your buttons. For information on the button-naming conventions used in DVD Studio Pro templates and layout styles, see Applying Templates or Layout Styles to a Menu with Buttons.

Importing Templates and Styles

You can import templates and styles from other systems. When you import a template or style, it is copied to the same locations used when you create a custom or project template or style. See Locations of Template and Style Files for more information.

To import a template or style using the File menu

1 Choose either File > Import > Style or File > Import > Template.

2 Use the import dialog to navigate to the templates or styles you want to import. You can select a single file or multiple files.

3 Select the Project checkbox if you want the template or style to be available to this project only. Deselecting Project makes this template or style available to all projects on this system.

4 Click Import to import the files.

To import a template or style using the Palette

1 Click the Templates or Styles tab in the Palette.

Note: When importing a style, it is not necessary to select the proper style type (button, layout, and so on). All style types can be imported.

2 Control-click in the Palette's thumbnail area, then choose Import from the shortcut menu.

3 Use the import dialog to navigate to the templates or styles you want to import. You can select a single file or multiple files.

4 Select the Project checkbox if you want the template or style to be available to this project only. Deselecting Project makes this template or style available to all projects on this system.

5 Click Import to import the files.

The imported templates and styles appear in the Palette and are ready for use.

There are several factors that determine how well an imported template or style will work on your system.

- Templates and styles only work with the video standard (NTSC or PAL) of the system on which they were created. You cannot import templates and styles from one standard into the other.
- Self-contained templates and styles work on all systems using the same video standard, regardless of what assets they contain or how they are arranged.
- Referencing templates and styles requires the assets to be in the same location on the new system as they were on the original system. Any assets that cannot be found when a template or style is applied are skipped, leaving those areas of the menu empty.

Deleting Templates and Styles

You can delete templates and styles once you no longer need them.

To delete a template or style

1 Select the template or style to delete. You can select multiple items to delete.

2 Do one of the following:

- Control-click the item to be deleted, then choose Delete Selected Template or Delete Selected Style from the shortcut menu.
- Click Delete at the bottom of the Palette.

3 A dialog appears, warning that deleting this item may affect this and other projects. Click OK.

Note: You cannot delete a template or style that contains assets currently in use on a menu.

The template or style is deleted.

Deleting Really Deletes

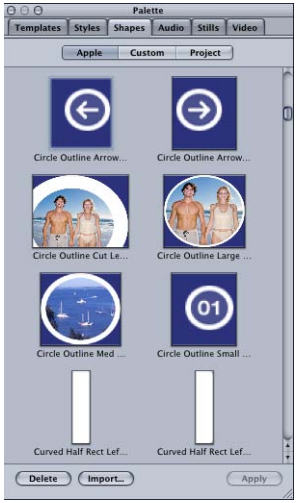
When you delete a template or style, the file is actually deleted from the disk. You cannot undo a deletion. This can be a serious issue if the template or style is self-contained because the assets used in the template or style are also deleted. Any projects that used the deleted template or style will no longer be able to access those assets, and you will need to relink their assets.

Deleting Apple Templates and Styles

You cannot delete the Apple templates supplied with DVD Studio Pro; however, you can delete the Apple styles. If you later decide you want to use the deleted styles, you must reinstall DVD Studio Pro to get them back.

Managing Shapes

The Palette contains a Shapes tab. You can use this tab to view thumbnails of the shapes, drag the shapes to the Menu Editor to use them as buttons or drop zones, and import shapes that you have created.



You can choose either small or large as the size for the thumbnails in the Palette in the General pane in DVD Studio Pro Preferences. See General Preferences for more information on the preferences.

Two Types of Shapes

There are two types of shapes that are available: normal and patches. You can create your own normal shapes; however, patches only come with DVD Studio Pro, and you cannot create your own.

What's a Patch?

Patches are shapes that are able to modify the assigned asset. For example, a shape may add a tint or a blur filter to the assigned asset. Some patches have a motion element although most are static. Patches can be positioned and sized just like normal shapes, and have still or video assets assigned to them.

Unlike normal shapes, you are not able to create custom patches.

Patches appear in the Apple group of the Shapes tab along with the normal shapes. You can tell which shapes are patches by choosing Patch Shapes in the Button Inspector's Style tab.

Applying a Shape

You can apply a shape to an existing button or drop zone (or group of buttons or drop zones) on a menu, or you can create a new button when you apply the shape. The method you use to apply the shape (use the Apply button or drag the shapes) determines what you are able to do.

Shapes are sorted into three groups:

- *Apple:* The shapes provided by DVD Studio Pro. These are available to all projects.

  Note: Not all shapes supplied with DVD Studio Pro support highlights. Some are intended to be used only with drop zones and do not include the highlight layer used by buttons.

- *Custom:* The shapes you import and designate as available to all projects created on this system
- *Project:* The shapes you import for use only in this project. These will not appear when you are working on other projects.

The Shapes tab in the Palette includes buttons so that you can choose which of these groups of shapes to view.

To apply a shape using the Apply button

1. In the Palette, select the shape's group (Apple, Custom, or Project), then select the shape you want to apply.
2. In the Menu Editor, do one of the following:
   - *To apply the shape to an existing button or drop zone:* Select the button or drop zone.
   - *To apply the shape to a group of buttons or drop zones:* Select the buttons or drop zones by holding down the Shift key while clicking them.
3. Click Apply.

   The shape is applied to the selected items.

   Note: The Apply button is disabled if you select more than one shape in the Palette. You cannot create a new button or drop zone using the Apply button.

To apply a shape by dragging

1. In the Palette, select the shape's group (Apple, Custom, or Project) so that the shape's thumbnail appears.
2. Drag the shape from the Palette to the Menu Editor, then do one of the following:
   - *To apply the shape to an existing button or drop zone:* Drag the shape to it.
   - *To create a new button or drop zone:* Drag the shape to an empty area of the menu and when the Drop Palette appears, choose either Create Button or Create Drop Zone.

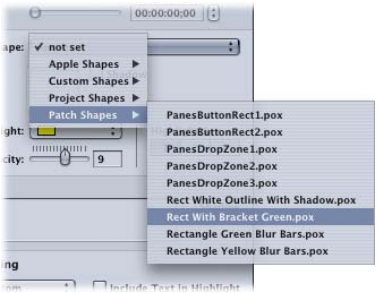
Note: You cannot apply the shape to multiple existing buttons or drop zones by dragging.

To assign a shape in the Button Inspector

1 In the Menu Editor, select the button to which you want to apply the shape.

2 Click the Style tab in the Button Inspector.

3 Choose a shape group from the Shape pop-up menu, then choose the shape to use from the submenu.



A thumbnail of the shape appears in the Button Inspector and the shape is applied to the button.

When you create a new button by dragging a shape to the Menu Editor, the shape is added to the menu at its actual size. This can be important if you intend your shapes to be a specific size when used on a menu. (When shapes are applied to an existing button, they are squeezed to fit it, which can distort it significantly.)

Importing a Shape

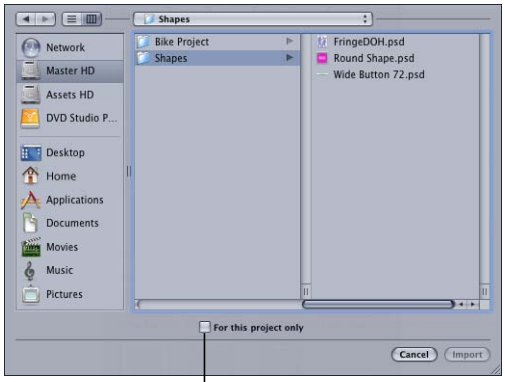
You can import shapes that you create. See Creating Shapes for information on creating shapes.

When you import shapes, you choose whether they are specific to a project or shared.

To import a shape

1 Click Import in the Shape tab in the Palette.

2 In the selection dialog that appears, locate and select the shape (or shapes) to import.



Select if you want the imported shapes to be used only with this project.

3 Select the Project checkbox if you want the shapes to be used only with this project. Deselect the checkbox to make them available to all projects on this system.

4 Click Import.

The imported shapes now appear in their group (Project or Custom).

For custom shapes, the shape file is copied to the [root]/Library/Application Support/DVD Studio Pro/Shapes folder. For project shapes, the shape is copied to the project bundle. (Apple shapes are contained in the DVD Studio Pro application bundle.)

Updating a Shape

When you create a custom shape, you will often find, once you've applied it to a button or drop zone on a menu, that you need to make an adjustment to it. For example, you might need to make the highlight area larger.

To reimport a shape

1 Click Import in the Shape tab in the Palette.

2 In the selection dialog that appears, locate and select the shape (or shapes) to reimport.

3 Select the Project checkbox if the shapes are used only with this project. Deselect the checkbox if they are available to all projects on this system.

4 Click Import.

A dialog appears, stating that the shape already exists.

5 Click Replace to import the new versions of the shapes, replacing the existing ones.

To see the new versions of the shapes, either in places they are already in use or in new places you want to use them, you must save your project, close it, and then open it again. Any older versions of the shapes are updated to the new versions.

Deleting a Shape

You can delete one or more shapes.

To delete a shape

1. In the Palette, select the shape's group (Apple, Custom, or Project) that contains the shape or shapes to be deleted.

   Note: If you delete an Apple shape, you must reinstall DVD Studio Pro to get the shape back.

2. Select the shape or shapes to delete. Use the Shift key to select multiple shapes.
3. Click the Shape tab's Delete button.

   The shape's file is deleted from its location (as determined by its group).

   Note: You cannot delete a shape that is currently in use on a menu.

Creating Menus Using the Layered Method

15

The layered method allows you to create independent versions of each button for each of the three states. This gives you great flexibility in changing a button's appearance when it is selected and activated.

This chapter covers the following:

- About Layered Menus (p. 335)
- Choosing the Menu's Background (p. 336)
- Choosing the Menu's Overlay (p. 338)
- About the Menu Inspector for Layered Menus (p. 338)
- Adding Buttons to Your Layered Menu (p. 343)
- About Layered Menu Button Properties (p. 344)
- Options in the Drop Palette for Layered Menus (p. 348)
- Drop Palette for Layered Menus—Dragging Assets (p. 349)
- Drop Palette for Layered Menus—Dragging Project Elements (p. 353)

About Layered Menus

When you create menus using the layered method, you specify independent 24-bit layers in an Adobe Photoshop file (PSD) for each state (normal, selected, and activated) of each button (as opposed to using an overlay or shapes, as you do with the standard method). See Layered Menu Creation Method for a discussion of the advantages and disadvantages of this method.

Menus created with the layered method can also use overlays. See Choosing the Menu's Overlay for details on using overlays. See Starting and Working with a Menu for information on creating a layered menu, naming it, and adding assets to it.

Note: You cannot change an existing menu from one kind of menu (standard or layered) to the other.

Choosing the Menu's Background

Layered menus must use the same PSD file for both the menu's background and the layered buttons. Because of this requirement, only PSD files with multiple layers can be used as backgrounds for layered menus.

For best quality, be sure your graphic:

- *Matches the menu's resolution and aspect ratio (4:3 or 16:9):* If you are creating 16:9 menus in SD projects, or with the 720 x 480p, 720 x 576p, or 1440 x 1080i HD resolutions in HD projects, be sure the graphic is anamorphic. See Creating Graphics to Use in Menus and Choosing an Aspect Ratio for details.
- *Conforms to the broadcast video color space:* Graphics that look stunning in your graphics program can look very different when viewed on DVD. Most graphics applications let you scale colors to NTSC or PAL color space.

DVD Studio Pro automatically scales the size of the background graphic to fit the frame size if necessary, which can result in the menu's background color appearing along some edges.

There are several ways to assign a background to a menu. Use the method that you feel most comfortable with. In all cases, these methods also replace an existing background.

Assigning a Menu Background Using the Inspector

You can assign a menu background using the Inspector. With this method, you can only choose from assets already imported into DVD Studio Pro.

To assign a menu background using the Inspector

1. Select the menu and make sure the Menu Inspector displays the menu properties.
2. Click the General tab in the Inspector (if it's not already visible).
3. Choose a background from the Background pop-up menu.

The selected file appears as the menu background, with all layers hidden. You can choose which layers to show in the Menu Inspector.

Assigning a Menu Background by Dragging

You can assign a background to a menu by dragging the asset from the Assets tab, the Palette, or a Finder window.

To assign a menu background by dragging it to the Menu Editor

1. Select the menu in the Outline tab, the Graphical tab, or choose it from the Menu Editor's View pop-up menu to display it in the Menu Editor.
2. Locate the background file you want to use in the Assets tab, Palette, or Finder window.
3. Drag the asset to an empty part of the Menu Editor and pause until the Drop Palette appears.

4 Choose one of the following:

- *Set Background—All Layers Visible:* To show all layers in the file.
- *Set Background—No Layers Visible:* To hide all layers in the file.

The background appears in the Menu Editor. You can choose which layers to show in the Menu Inspector.

To assign a menu background by dragging it to the Outline or Graphical tab

1 Click the Outline or Graphical tab and select the menu you want to assign the background to.

2 Locate the background file you want to use in the Assets tab, Palette, or Finder window.

3 Assign the background file to the menu by dragging the file to the menu's name or tile. A box appears around the name or tile to let you know the menu will receive the background file.

The background appears in the Menu Editor, with all layers hidden, when you select the menu. You can then choose which layers to show in the Menu Inspector.

Choosing a Menu's Background from a Layered Photoshop File

You can choose a layer (or several) from an Adobe Photoshop format (PSD) file to use as the menu background. One PSD file can supply backgrounds and overlays for several menus.

To choose a menu background from a PSD file

1 Either create a new menu or select an existing one.

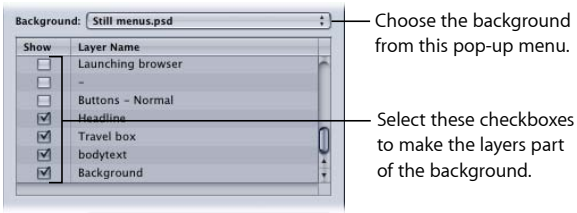
2 Click the General tab in the Menu Inspector.

3 Assign the PSD as the menu's background by doing one of the following:

- Choose it from the Background Asset pop-up menu in the Menu Inspector.
- Drag it to the Menu Editor and choose Set Background from the Drop Palette.

The PSD file's layer names appear in the Background area of the General tab.

4 Select the checkboxes next to the layers that make up the background.



Choosing the Menu's Overlay

You can use overlays with layered menus as well as with standard menus. Every aspect of using them, from selecting the file and configuring its color mapping, is identical to how you use overlays in a standard menu. See Choosing the Menu's Overlay for information on adding an overlay to your layered menu. See Understanding Color Mapping for information on configuring color mapping for simple and advanced overlays.

About the Menu Inspector for Layered Menus

The tabs within the Layered Menu Inspector provide a variety of menu configuration settings. These settings control everything from background and overlay configuration, to transition and timeout settings.

The Layered Menu Inspector has five tabs: General, Menu, Transition, Colors, and Advanced.

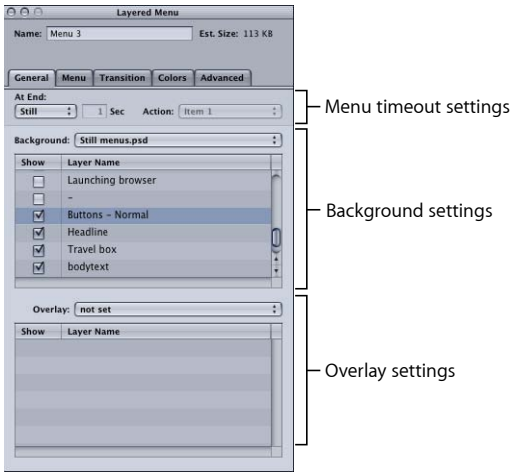
Settings at the Top of the Layered Menu Inspector

The top of the Layered Menu Inspector contains two settings.

- *Name:* Enter the name for this menu.
- *Est. Size:* Displays the estimated amount of disc space the menu requires based on the assigned assets.

General Tab in the Layered Menu Inspector

The General tab in the Layered Menu Inspector is divided into three sections: The upper section contains the menu timeout settings, the middle section contains the background configuration settings, and the lower section contains the overlay configuration settings.



Menu Timeout Settings

- *At End:* Choose whether the menu displays indefinitely (Still) or performs a jump action if there is no activity for a period of time (Timeout).
- *Sec:* Active only when At End is set to Timeout. Enter the number of seconds the menu appears before jumping to the Action setting.
- *Action:* Choose the element to jump to once the timeout ends.

Background Settings

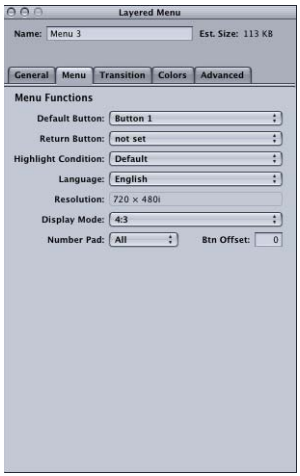
- *Background:* Choose the layered PSD file to use as the menu's background.
- *Show:* Select the checkboxes next to each layer that you want to appear as part of the background.

Overlay Settings

- *Overlay:* Choose the file to use as the menu's overlay file. Set this only if you want to use both overlay-based buttons and layered buttons on this menu.
- *Show:* Select the checkbox next to the layer you want to use as the overlay for the menu. Unlike backgrounds where you can select multiple layers, you can only select a single layer for use as an overlay.

Menu Tab in the Layered Menu Inspector

Most settings in the Menu tab in the Layered Menu Inspector are optional. An exception is the Aspect Ratio setting, which must be set correctly for each menu.



- *Default Button:* Choose the button to be selected when the menu appears during playback of the title. This setting can be overridden by any element that jumps to this menu, based on its jump setting, and the Highlight Condition setting.
- *Return Button:* Choose the project element to jump to if you press the Return button on the DVD player's remote control.
- *Highlight Condition:* Provides an alternative method to the Default Button setting for determining which button to highlight. When Highlight Condition is set to Default, the Default Button setting supplies the button highlight setting. When Highlight Condition is set to one of its stream settings (audio, subtitle, camera angle), the number of the stream last played determines the button to highlight. This setting can be overridden by any element that jumps to this menu, based on its jump setting.
- *Language:* Choose the language in which this menu should be displayed. See Using Languages with Menus for more information.
- *Resolution:* Choose the menu's resolution.
  - *For SD projects:* The resolution is either 720 x 480i (NTSC) or 720 x 576i (PAL).
  - *For HD projects:* You can choose from any of the supported resolutions. DVD Studio Pro Preferences includes a setting for the default resolution. The resolution automatically changes to match the menu's background video resolution if it matches one of the supported resolutions. Choosing a resolution different than that used by the menu's background video results in the menu being scaled and rendered to this setting when you build the project.

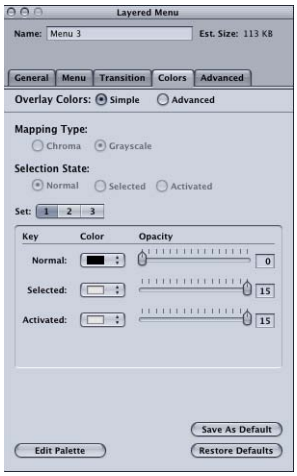
- *Display Mode:* Set the aspect ratio for this menu (4:3 or 16:9). With 16:9, you also choose how it will display on a 4:3 monitor. The aspect ratio of the background and overlay must match this setting. See Working with 16:9 Menus for more information.
- *Number Pad:* Defines which buttons are directly accessible by a DVD player's numeric keypad. Choose All, None, or a button number from the pop-up menu. When you choose a button number, that button and all buttons less than that number are accessible via the numeric keypad—buttons greater than this value are blocked from direct access.
- *Btn Offset:* You can use this setting to offset button numbers so they make sense to a viewer who wants to select a button by entering its number. For example, you may have a set of scene selection menus with numbered scenes. One of the menus may have scenes 23 to 34, with the button for scene 23 being the first button on the menu. If you enter an offset value of 22 for this menu, when the viewer enters 23 on the remote control, 22 is subtracted from it, with the result being 1—the button's actual number.

Transition Tab in the Layered Menu Inspector

The Transition tab is used to configure a button transition for this menu. See Transition Tab in the Menu and Button Inspectors for details on this tab.

Colors Tab in the Layered Menu Inspector

The Colors tab is identical to the Menu Inspector for standard menus. See Colors Tab in the Menu Inspector with Simple Selected and Colors Tab in the Menu Inspector with Advanced Selected for information on the Colors tab.



Advanced Tab in the Layered Menu Inspector

The Advanced tab in the Layered Menu Inspector contains settings that are used only in specialized projects.

Disabled User Operations Settings

- *Disabled User Operations:* Select the functions that you want to be disabled while this menu plays. See User Operations for more information.

Playback Options Settings

- *Pre-Script:* Choose a script to run before the menu appears. This script can decide whether to show the menu or configure the DVD player before showing it. See Pre-Scripts for information on pre-scripts.
- *DVD@CCESS:* Selecting this checkbox allows you to add DVD@CCESS links, which provide additional functionality to your title when played on a computer. See DVD@CCESS for more information.
- *Display Condition:* Selecting this enables the Display Condition settings which control whether this menu should be displayed or not, and to define what should be displayed if not this menu. See Display Condition for more information.

Adding Buttons to Your Layered Menu

There are two button types you can add to a layered menu: layered buttons and overlay buttons. In both cases, the first step is to create a button active area. See Creating Menus Using the Standard Method.

Once you create the active areas, you can configure the buttons. For overlay buttons, see Using Simple Overlay Color Mapping and Using Advanced Overlay Color Mapping for details. For layered buttons, see Configuring a Layered Button.

Mixing Overlay Buttons with Layered Buttons

So that you can combine overlay and layered buttons on the same menu, the color mapping settings are active at all times—even when you aren't adding an overlay to the menu. If you see an unexpected color appear in the active areas in any of the button states (normal, selected, or activated), you need to configure the color mapping settings.

If no overlay file is assigned to a layered menu, a plain white image is used in place of the overlay file. If the color mapping settings apply a color to white, that color will appear in the active areas.

When working with a layered menu without an assigned overlay file, you must either:

- Select Simple as the Overlay Colors setting. This automatically sets white to be fully transparent.
- Select Advanced as the Overlay Colors setting, then set the opacity for white to 0 for each selection state.

Configuring a Layered Button

Configuring a layered button is a matter of selecting layers in the menu's PSD file to display in the three button states (normal, selected, and activated).

To configure a layered button

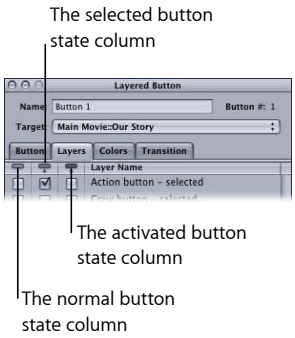
1 Click in the button's active area.

The Button Inspector appears.

2 Set the button's connection by choosing an element from the target pop-up menu in the top section of the Button Inspector.

3 Click the Layers tab.

A list of all layers in the PSD file appears.



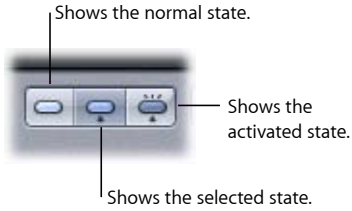
4 Select the checkbox in the Normal column next to the layer to display when this button is not selected or activated. You can select more than one layer.

If the normal state for the button is already part of the background, you do not need to select layers in the Normal column.

5 Select the checkbox in the Selected column next to the layer to display when this button is selected. You can select more than one layer.

6 Select the checkbox in the Activated column next to the layer to display when this button is activated. You can select more than one layer.

7 To verify the layer settings, use the Menu Editor's button state icons to select the state (normal, selected, or activated) to display.



You need to repeat this process for each layered button in your menu.

About Layered Menu Button Properties

The Layered Button Inspector has four tabs: Button, Layers, Colors, and Transition.

Settings at the Top of the Layered Button Inspector

The top of the Layered Button Inspector has three settings.

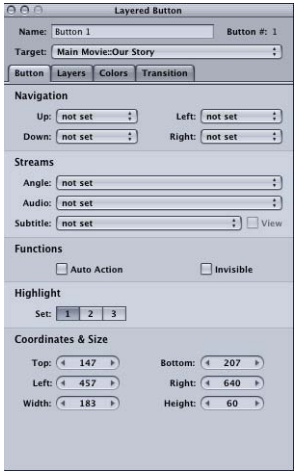
- *Name:* By default, buttons manually added to a menu are named "Button _," where "_" is the button number on that menu. To reduce confusion when viewing a list of the menu's buttons, it is helpful to rename the buttons based on their functions.

  Next to the button's name is its number. This number is based on the order in which the buttons are added to the menu. See About Button Numbers for information on changing this number and why it can be important.

- *Target:* You can use this pop-up menu to define a button's action when activated. (You can also use the Connections tab or Control-click the button.) Often you must set the connection later because what you want to jump to has not yet been added to the project. The pop-up menu contains all possible project elements you can jump to.

Button Tab in the Layered Button Inspector

The Button tab in the Layered Button Inspector contains settings that allow you to customize the selected button.



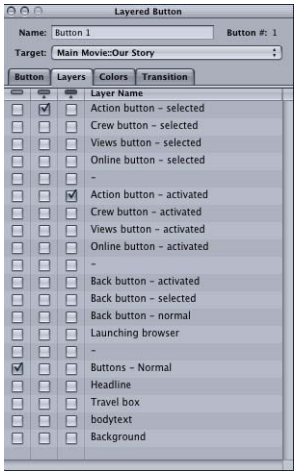
- *Navigation:* This area lets you set the actions that take place when the viewer uses the arrow buttons on the DVD player's remote control to navigate around the title. Because this is the typical way the title will be viewed, it is important to spend some time configuring the navigation in a logical, predictable way. See Configuring Button Navigation for information.

- *Angle/Audio/Subtitle Streams:* Use these three pop-up menus to connect a button to specific audio, subtitle, and angle streams to play back. For the subtitle stream, you can also choose whether subtitles should appear.
- *Auto Action:* If you enable Auto Action for a button, it activates automatically as soon as it is navigated to, without the viewer needing to press Enter. This is useful in menus, such as scene selection menus, in which you use Next and Previous buttons; you can assume that if viewers navigate to the Next or Previous button, they want to activate it.

  Note: With overlay-based buttons, if you select this option, only the activated color mapping appears when the button is navigated to, skipping the selected color mapping.
- *Invisible:* Applies to overlay-based buttons. Allows you to have a button that does not display highlights in the normal, selected, or activated state. This is useful when you want to have a menu with text and no visible buttons. The text could tell the viewer to press the Enter button to go to the next menu or start playback (or whatever the button is set to jump to).
- *Highlight:* Applies to overlay-based buttons. Allows you to choose the color mapping set to assign to this button.
- *Coordinates & Size:* This area lets you set the location of each edge of the button's active area, plus the area's height and width. The upper-left corner of the menu is at pixel 0, line 0. You can enter values for each edge, allowing you to precisely position and size the button's active area. (You can also drag the active area and each of its edges with the pointer.)

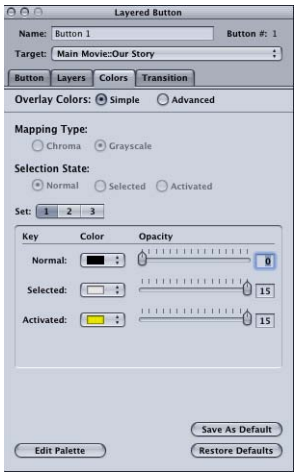
Layers Tab in the Layered Button Inspector

The Layers tab in the Layered Button Inspector lists the layers in the PSD file assigned as the menu's background. There are three columns of checkboxes—normal (on the left), selected (in the center), and activated (on the right)—next to each layer. For the current button, you select at least one layer to appear when the button is selected, and a second layer to appear when the button is activated. You do not need to select a layer for the button's normal state if it is part of the menu's background.



Colors Tab in the Layered Button Inspector

The Colors tab is identical to the one used in the Button and Menu Inspectors for standard menus. See Colors Tab in the Menu Inspector with Simple Selected and Colors Tab in the Menu Inspector with Advanced Selected for details on using this tab.



Transition Tab in the Layered Button Inspector

The Transition tab is used to configure a button transition for this button. See Transition Tab in the Menu and Button Inspectors for details on this tab.

Options in the Drop Palette for Layered Menus

Following are descriptions of the various Drop Palette options that can appear when you drag an asset or element to the Menu Editor. See Viewing the Drop Palette for information on using the Drop Palette options.

The following descriptions are grouped by the type of item you are dragging (asset, project element such as a track or slideshow, and a template, style, or shape from the Palette). Details for standard menus are listed first, followed by the details for the layered menus.

For those Drop Palette options that appear when you drag a motion video asset, a matching audio asset is also added (if applicable), as long as:

- The "Find matching audio when dragging" setting in the Track pane of DVD Studio Pro Preferences is selected.
- An audio file with the same base name as the video file is located in the same folder as the video asset.

The following details assume the "Find matching audio when dragging" preference is selected and a suitable audio file is found.

Drop Palette for Layered Menus—Dragging Assets

The following sections list the choices in the Drop Palette that appear when you drag assets to an empty area or button in a layered menu.

Dragging a Motion Video Asset to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button and Track (default option)	• Creates a button at this menu location. • Creates a new track with this video. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Adds a link from the new button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.
Create Button and Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. • Creates a track and adds the chapter markers to it. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Creates a button on this menu to link to the first of the new chapter index menus. • Creates one or more new chapter index menus (using the standard method), depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons on the chapter index menus. • Assigns the video from each marker to its button's thumbnail.

Dragging a Motion Video Asset to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Track (default option)	• Creates a new track with this video. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Adds a link from the button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.
Create Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. • Creates a track and adds the chapter markers to it. • Assigns matching audio as the track's audio. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Links the button to the first of the new chapter index menus. • Creates one or more new chapter index menus (using the standard method), depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons on the chapter index menus. • Assigns the video from each marker to its button's thumbnail.

Dragging a Video/Audio Pair to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button and Track (default option)	• Creates a button at this menu location. • Creates a new track with this video and audio. • Names the track the same as the video asset. • Adds a link from the new button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.
Create Button and Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. • Creates a track and adds the chapter markers to it. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Creates a button on this menu to link to the first of the new chapter index menus. • Creates one or more new chapter index menus (using the standard method), depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons on the chapter index menus. • Assigns the video from each marker to its button's thumbnail.

Dragging a Video/Audio Pair to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Track (default option)	• Creates a new track with this video and audio. • Names the track the same as the video asset. • Adds a link from the button to the first marker of the new track. • Sets the new track's End Jump setting to this menu.
Create Chapter Index	Use this option with video that has had chapter markers added with Compressor, Final Cut Express, or Final Cut Pro. • Creates a track and adds the chapter markers to it. • Names the track the same as the video asset. • Sets the new track's End Jump setting to this menu. • Links the button to the first of the new chapter index menus. • Creates one or more new chapter index menus (using the standard method), depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the new track to buttons on the chapter index menus. • Assigns the video from each marker to its button's thumbnail.

Dragging a Single-Layer Still Picture to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Overlay (default option)	• Uses the picture as this menu's overlay.
Create Standard Submenu	• Creates a button at this menu location. • Creates a new standard menu with this picture as the background. • Adds a link from the new button to the new menu.

Dragging a Single-Layer Still Picture to a Button

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Standard Submenu (default option)	• Creates a new standard menu with this picture as the background. • Adds a link from the button to the new menu.

Dragging a Multiple-Layer Still Picture to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Set Background—All Layers Visible (default option)	Once set, you can disable layers in the Menu Inspector. • Uses the picture as this menu's background, with all layers visible.
Set Background—No Layers Visible	Once set, you can enable layers in the Menu Inspector. • Uses the picture as this menu's background, with no layers visible.
Set Overlay	Once set, you can select the layer to use as the overlay in the Menu Inspector. • Uses the picture as this menu's overlay, with no layers assigned to the overlay.
Create Standard Submenu	Once set, you can enable layers for the new menu in the Menu Inspector. • Creates a button at this menu location. • Creates a new standard menu with this picture as the background, with no layers visible. • Adds a link from the new button to the new menu.
Create Layered Submenu	Once set, you can enable layers for the new menu in the Menu Inspector. • Creates a button at this menu location. • Creates a new layered menu with this picture as the background, with no layers visible. • Adds a link from the new button to the new menu.

Dragging a Multiple-Layer Still Picture to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Standard Submenu (default option)	Once set, you can enable layers for the new menu in the Menu Inspector. • Creates a new standard menu with this picture as the background, with no layers visible. • Adds a link from the button to the new menu.
Create Layered Submenu	Once set, you can enable layers for the new menu in the Menu Inspector. • Creates a new layered menu with this picture as the background, with no layers visible. • Adds a link from the button to the new menu.

Dragging Multiple Still Pictures (or a Folder) to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Button and Slideshow (default option)	• Creates a button at this menu location. • Creates a new slideshow. • Adds a link from the new button to the new slideshow. • Sets the slideshow's End Jump setting to this menu.

Dragging Multiple Still Pictures (or a Folder) to a Button

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Slideshow (default option)	• Creates a new slideshow. • Adds a link from the button to the new slideshow. • Sets the slideshow's End Jump setting to this menu.

Drop Palette for Layered Menus—Dragging Project Elements

The following section lists the choices in the Drop Palette that appear when you drag project elements from the Outline or Graphical tab to an empty area or a button in a layered menu.

Dragging an Existing Track to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Adds a link from the new button to the first marker of the track. • Sets the track's End Jump setting to this menu (if it has not already been set).
Create Button and Chapter Index	• Creates a button on this menu to link to the first of the new chapter index menus. • Creates one or more new chapter index menus (using the standard method), depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the track to buttons in the chapter index menus. • Assigns the video from each marker to its button's thumbnail. • Sets the track's End Jump setting to this menu (if it has not already been set).

Dragging an Existing Track to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Connect to Track (default option)	• Adds a link from the button to the first marker of the track. • Sets the track's End Jump setting to this menu (if it has not already been set).
Create Chapter Index	• Links the button to the first of the new chapter index menus. • Creates one or more new chapter index menus (using the standard method), depending on the number of markers and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each chapter marker from the track to buttons in the chapter index menus. • Assigns the video from each marker to its button's thumbnail. • Sets the track's End Jump setting to this menu (if it has not already been set).

Dragging a Story to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Adds a link from the new button to the story.

Dragging a Story to a Button

The following option appears in the Drop Palette:

Drop Palette options	Actions
Connect to Story (default option)	• Adds a link from the button to the story.

Dragging a Slideshow to an Empty Area

The following options appear in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Adds a link from the new button to the slideshow. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).
Create Button and Chapter Index	• Creates a button on this menu to link to the first of the new chapter index menus. • Creates one or more new chapter index menus (using the standard method), depending on the number of slides and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each slide from the slideshow to buttons in the chapter index menus. • Assigns the picture from each slide to its button's thumbnail. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).

Dragging a Slideshow to a Button

The following options appear in the Drop Palette:

Drop Palette options	Actions
Connect to Slideshow (default option)	• Adds a link from the button to the slideshow. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).
Create Chapter Index	• Links the button to the first of the new chapter index menus. • Creates one or more new chapter index menus (using the standard method), depending on the number of slides and the button layout used. • Opens the Choose Template or Layout Style dialog so you can choose the template or layout style to use for the chapter index menus. • Links each slide from the slideshow to buttons in the chapter index menus. • Assigns the picture from each slide to its button's thumbnail. • Sets the slideshow's End Jump setting to this menu (if it has not already been set).

Dragging a Menu to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Adds a link from the new button to the menu.

Dragging a Menu to a Button

The following option appears in the Drop Palette:

Drop Palette options	Actions
Connect to Menu (default option)	• Adds a link from the button to the menu.

Dragging a Script to an Empty Area

The following option appears in the Drop Palette:

Drop Palette options	Actions
Create Button (default option)	• Creates a button at this menu location. • Adds a link from the new button to the script.

Dragging a Script to a Button

The following option appears in the Drop Palette:

Drop Palette options	Actions
Connect to Script (default option)	• Adds a link from the button to the script.

Using Advanced Menu Features

16

Adding menu transitions and creating menus for multiple languages are advanced features that can add value to your DVD project.

Menu transitions are short video clips that play at the beginning of a menu (intro clips) and when buttons are pressed (transition clips). There are several approaches you can take to add these clips to your project.

You can also configure a menu to support up to 16 different languages. By assigning different backgrounds, overlays, audio, and text to each menu's language, you can create a DVD that supports a wider audience.

This chapter covers the following:

- Adding Intro and Transition Clips to Menus (p. 357)
- Using Languages with Menus (p. 364)

Adding Intro and Transition Clips to Menus

You can make the DVD viewing experience more polished by adding short video clips that play at the beginning of a menu (*intro* clips) and when buttons are pressed (*transition* clips).

Using Menu Intro Clips

Menu intro clips are most effective when they build up to the menu's background video. For example, if the menu's background is a shot of a building with buttons in its windows, you could have an intro clip that fades up from black to the shot of the building, and then has the button elements fly in from off the screen and take their place in the windows.

There are three approaches you can take to create a menu intro effect:

- *Combine the intro clip with the menu's background video:* This method guarantees a seamless transition between the intro clip and the original menu's background. The Menu Editor includes a Loop Point setting that you can use to control where the menu jumps to when its playback is looped. This allows you to configure the intro clip to play only the first time a menu's background plays. The loop point also controls when the button highlights appear. Because button highlights cannot move, you would not want them visible during the intro while the button elements are moving. See About the Motion Settings for more information.

  A disadvantage of this mode is that, unless you use a simple script, the menu's intro must play each time the menu is accessed because you cannot jump directly to the menu's loop point. (See Jumping to a Menu's Loop Point for an example of the script.)

- *Configure the intro clip as its own menu:* To do this, you need to create a menu and assign the intro clip as its background. You also need to set the menu's At End setting to Timeout, enter 0 as the Sec, and set the Action to be the menu this intro clip is for.

  Whenever you want to jump to the original menu, you can jump to this intro menu instead—the intro menu will automatically jump to the original menu once its intro clip plays.

  The advantage of this method is that, because you are jumping from one menu to another menu, the disruption during that jump time should be minimal. (By default, all menus are stored in the same general area on a DVD disc, making it easier for the DVD player to jump between them. Additionally, you can use the VTS Editor to ensure the two menus are next to each other.) Another advantage is that you can choose whether to jump to the intro menu or to jump directly to the original menu, avoiding forcing the viewer to watch the intro menu multiple times.

- *Configure the intro clip as its own track:* To do this, you need to create a track and add the intro clip to its V1 video stream. The only configuration you need to do is to set the track's End Jump setting to the original menu.

  Whenever you want to jump to the original menu, you can jump to this intro track instead—the intro track will automatically jump to the original menu once its intro clip plays.

About Button Transition Clips

Button transition clips provide the opposite effect of the menu intro clip—they provide a transition from the menu background's buttons to the element (a track or another menu) that the menu's button is connected to. Using the same example used for the intro clips (a shot of a building with buttons placed in its windows), the transition clip could have the button elements fly off the screen and then fade the shot of the building to black.

You can use the menu transition feature to automatically create the transition clips or you can manually create button transition clips.

Using the Menu Transition Feature

The menu transition feature makes it easy to automatically create transition clips for all buttons on a menu. You define a transition in the Menu Inspector that is then applied to all buttons and the timeout action (if set). By default, each button is set to use the menu's transition settings; however, you can modify or disable the settings for each button.

Transition settings include:

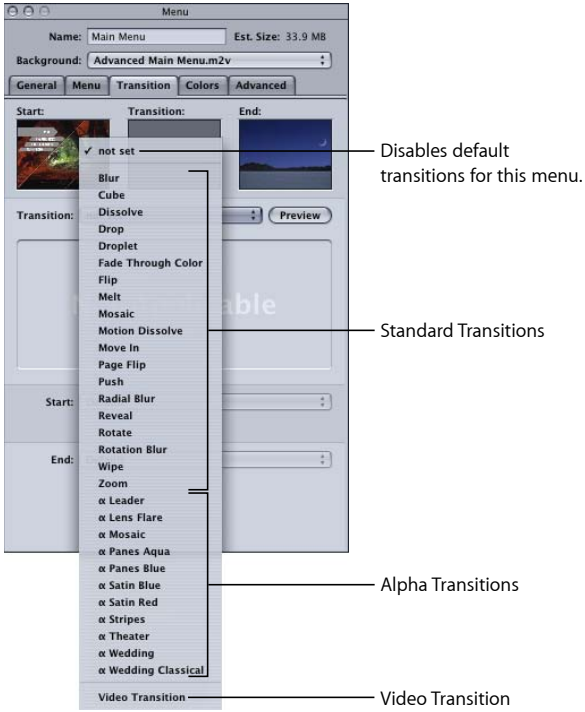
- Transition (crossfade, wipe, and so on)
- Specific parameters based on the transition type (duration, direction, and so on)
- Alternative start and end video

The menu transition feature can be used with standard and layered menus.

Important: Be aware of the aspect ratio and resolution of the button's target when configuring transitions. All transitions from a menu are based on the menu's aspect ratio and resolution. Depending on the type of monitor a viewer is using, if the button's target uses a different aspect ratio or transition, there may be a noticeable glitch when the monitor switches from the menu's settings to the button target's settings.

About the Transition Types

DVD Studio Pro includes a variety of Standard and Alpha Transitions you can use with your menus. These same transitions are available in slideshows and tracks with still images. Menus also allow you to specify a video clip to use in place of the Standard Transitions.



Alpha Transitions

DVD Studio Pro includes several Alpha Transitions. These transitions use short video clips to produce a transition from the current picture to the new picture. These transitions, indicated with the Greek letter alpha in front of their name, have no settings other than a duration.

Additionally, you can even create and import your own Alpha Transitions. See Preparing Alpha Transitions for details on the process.

Standard Transitions

When you choose a Standard Transition from the Transition pop-up menu in the Transition tab in the Menu or Button Inspector, DVD Studio Pro creates a short video clip to be used as the transition.

The transition clips use a start and end video frame, with the transition controlling how the video changes from one to the other.

- *The start frame:* This is the menu with all buttons in the normal state. If the menu has a video asset as its background, the loop point frame (or first frame, if the loop point is not set) of the video is used as the start frame. The start frame also includes the menu's drop zones and text objects.
- *The end frame:* This is the first frame of the target the button is jumping to. If the button jumps to a script, the end frame is black. If you change the button's target, the end frame automatically updates.

You are able to assign specific assets or colors as the start and end video frames in the Menu and Button Inspectors. See Transition Tab in the Menu and Button Inspectors for more information.

The transition clips that are created with the menu transition feature are rendered as part of the build process. They are placed in the same video title set (VTS) file as the menus. When authoring a project that will fill the DVD disc, you must take into account that a transition video clip is rendered for each menu button that has transitions enabled—a menu with 18 buttons can require 18 transition video clips. This can have a significant impact on the amount of disc space the menus require. See Transitions for more information.

Video Transitions

When you choose Video Transition from the Transition pop-up menu in the Transition tab in the Menu or Button Inspector, you can assign a short video clip to be used as the transition clip.

Adding Button Transitions to a Menu

You can set a default transition for the menu. This transition is applied to all buttons.

To set a transition for a menu

1. Select the menu in the Outline tab, the Graphical tab, or from the Menu Editor's View pop-up menu.
2. Click the Transition tab in the Menu Inspector.
3. Choose either a Standard Transition or the Video Transition from the Transition pop-up menu.

   You can choose "not set" to disable default transitions for this menu. (You can still configure individual buttons to use transitions.)
4. Configure the transition using its specific parameters.

   Once you have configured the menu's transition, you can modify or disable it at each button.

To modify a button's transition

1 Select the button to be modified.

2 Click the Transition tab in the Button Inspector.

The Transition setting shows "Same as Menu" by default.

3 Choose the transition to use from the Transition pop-up menu.

You can choose "not set" to disable transitions for that button.

4 Configure the transition using its specific parameters.

Transition Tab in the Menu and Button Inspectors

The Transition tabs in the Menu and Button Inspectors are identical—the only difference is that the Transition pop-up menu in the Button Inspector has a "Same as Menu" choice that the Menu Inspector does not have.

- *Start thumbnail:* Shows the video frame that a still transition will start from.
- *Transition thumbnail:* Provides a preview of a still transition when you click the Preview button, or a preview of a video transition when you click the Play button.
- *End thumbnail:* Shows the video frame that a still transition will end with. This thumbnail is empty in the Menu Inspector unless you have used the End pop-up menu to specify an ending frame.
- *Transition:* Choose the transition to use. In the Menu Inspector, this sets the default transition for this menu, which you can override at each button.
  - *not set:* Disables transitions for this menu or button.
  - *Standard Transition:* Creates a transition clip based on the Standard Transitions supplied with DVD Studio Pro.

- *Video Transition:* Uses a video clip you assign to create a transition. See About the Transition Types for more information.
- *Same as Menu:* Only available in the Button Inspector. Sets the current button to use the transition settings in the Menu Inspector.

- *Preview:* Click this to preview the current transition in the Transition thumbnail area.
- *Parameters area:* Contains the parameters, including the duration, for the current transition. Each transition has its own set of parameters.
- *Start:* Choose the start frame for the transition to use.
  - *With Default:* The start frame is the menu's background.
  - *With Solid Color:* You are able to choose a color to use as the start frame.
  - *With Stills and Videos:* You are able to choose a specific asset to use as the start frame. In the case of videos, an Offset setting appears that allows you to choose the video frame to use.

- *End:* Choose the end frame for the transition to use.
  - *With Default:* The end frame is the menu's background.
  - *With Solid Color:* You are able to choose a color to use as the end frame.
  - *With Stills and Videos:* You are able to choose a specific asset to use as the end frame. In the case of videos, an Offset setting appears that allows you to choose the video frame to use.

Transition Parameters

Each transition has its own parameters. In many cases, the settings are self-explanatory; however, in some cases, the settings are not obvious. See Transition Parameters for details on the parameters for each transition.

Manually Creating Button Transition Clips

Transition clips are inserted between the button and the button's connection. While a menu's intro clip plays when you jump to the menu, button transitions play when you activate a specific button. If you have eight buttons on a menu and want the transition clip to play when each button is activated, you have to create a separate transition clip for each button because the end of the transition clip needs to jump to the button's actual connection.

There are two approaches you can take to create the button transition effect:

- *Configure the transition clip as its own menu:* To do this, you need to create a menu and assign the transition clip as its background. You also need to set the menu's At End setting to Timeout, enter 0 as the Sec, and set the Action to be the element that the button originally connected to. Then you need to change the original menu's button connection to this transition menu.

  The advantage of this method is that, because you are jumping from one menu to another menu, the disruption during that jump time should be minimal. (All menus are stored in the same general area on a DVD disc, making it easier for the DVD player to jump between them.)

- *Configure the transition clip as its own track:* To do this, you need to create a track and add the transition clip to its V1 video stream. The only configuration you need to do is to set the track's End Jump setting to the element that the button originally connected to, and to change the original menu's button connection to this transition track.

Using Languages with Menus

You can configure a menu to support up to 16 different languages. When the DVD first starts playing, it checks the menu language setting of the DVD player and automatically displays the corresponding menu (if a menu for that language is available) or the menu for the first language available (if there is no language match).

The Outline tab lists the languages you have added to the project in the Languages section. The languages you see there are used to determine only which menus to display and have no effect on the stream settings within the tracks. By default, one language, based on the Default Language setting in the Project pane of DVD Studio Pro Preferences, appears in the Outline tab.

You do not actually create different menus for each language—you simply assign separate background, overlay, and audio (if applicable) files to each language. You can also change the text in any text objects and buttons. These three files and the text changes are the only differences between the languages. Button active areas, links, and all other menu settings are exactly the same for each language.

Note: Because the start frames of transitions are based on the menu's background video, separate transition clips are rendered for each language that uses a different background video.

Creating and Configuring Menu Languages

There are two approaches you can take to configure menus for multiple languages:

- *Create the primary language's menu first, and then create the alternate languages in the Outline tab:* When you create the menu languages after you have created the primary menu, all of the primary menu attributes are applied to all language versions of the menu, including those that can be different between the languages. This makes it easier to configure the menus for the other languages, especially if you are not changing much between the different languages.
- *Create the languages first, and then create the menus:* When you create the languages first, the menus all start out empty. Anything you apply to one of the menus that is not language-specific gets applied to all versions of the menu. If you apply an item that is language-specific—for example, you create a text object—a text object is created on all versions of the menu, but only the menu you created it on will have the text and text attributes (font or color). This can require more effort because you have to set not only the text, but its attributes for each version of the menu. (If you had created the primary menu first, all of the other versions would have the text object with its font and color—all you would need to do would be type the new text.)

Most often you will find yourself using a mixture of these methods. For example, you might create the languages and menus, and then find you need to add an additional language. The menu configurations for the new language will match the primary menu settings.

Adding Menu Languages

You can use the Outline tab's shortcut menu to create menu languages.

To create menu languages

Do one of the following:

- Choose Project > Add to Project > Language, or press Command-Slash (/).
- Control-click in the Outline tab, choose Add from the shortcut menu, then choose Language from the submenu.

The new language appears in the Outline tab under the Languages heading. By default it is named "English _," with "_" being the number of the language. The General pane in DVD Studio Pro Preferences contains a project default language setting that you can use to define the default language. See General Preferences for more information.

Important: For every language you add, DVD Studio Pro creates a new menu for each menu in your project. This is true whether or not you assign different backgrounds to each language. For projects with a lot of motion menus, these additional menus can take up a significant amount of space on the DVD.

Configuring Menu Languages in the Outline Tab

You can use the Outline tab to configure the menu languages.

To configure menu languages using the Outline tab

1 Click the triangle next to Languages to display the available languages. There should be at least one entry.

2 Select the language entry to open the Language Inspector.

3 Choose a language from the Language Code pop-up menu. This is the language that this language element should map to on the DVD player when the title plays.

4 If desired, enter a new name in the Language Name area. This is the name that you will see when configuring your menus. By default, it changes to match the name of the language selected in the Language Code pop-up menu. This name is not seen by the viewer; it is strictly for your use while configuring menus.

5 To remove a language, select it in the Outline tab and press the Delete key.

Setting Up Menus for the Languages

Once you have created and configured your languages, you can configure their menus. To do this, you need to have created and imported all assets (backgrounds, overlays, and audio streams) that will be used for the different languages.

To configure a menu for a language

1 Select a menu. It does not have to be fully configured yet. Keep in mind that all settings (with the exception of the background, overlay, audio file, and text) are shared among all languages.

2 Do one of the following to choose a language to configure:

- Choose the language from the Language pop-up menu in the Menu tab in the Menu Inspector.
- Choose the language from the Menu Editor's language pop-up menu, next to the View pop-up menu.

3 Select the background file, overlay file, and audio file to use for this language. You can use the same file for multiple languages.

Note: These files must be compatible (the same format, resolution, and, in the case of audio, the same bit rate, sample size, and sample rate) between all language versions of the menu.

4 If desired, change the text in any text objects and buttons to what you want to appear for that language. You can also change the font and color for each language.

5 Select any additional languages and set their asset files and text as you like.

When you choose a language that you have already configured with alternate assets, the menu's assets and text change to match those settings.

Creating and Editing Tracks

17

The main content of a DVD project is contained in tracks, which hold pieces of video, audio, and subtitles that play as a unit.

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- About Track Limits in a DVD (p. 370)
- Working with a Track's Assets (p. 370)
- How Many Tracks Should You Have? (p. 371)
- About Subtitle Streams (p. 371)
- DVD Studio Pro Tools for Working with Tracks (p. 371)
- Creating Tracks (p. 372)
- Opening Tracks (p. 373)
- Setting Track Properties (p. 373)
- About the Track Editor (p. 377)
- Configuring the Track Editor (p. 377)
- Understanding Time Information in the Track Editor (p. 380)
- Supported Asset Types (p. 384)
- Adding Video and Audio Assets (p. 386)
- Editing Video and Audio Clips (p. 390)
- Setting Stream Properties (p. 392)
- Exporting an MPEG Clip (p. 393)
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- About the Marker Types (p. 399)
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- Introduction to Stories (p. 403)
- Creating a Story for a Track (p. 404)
- Using the Story Editor (p. 404)
- Setting Story Properties (p. 405)
- Setting Story Entry Properties (p. 407)
- Simulating a Story (p. 407)
- Adding Alternate Video Streams (p. 408)
- Using Still Clip Transitions (p. 410)
- Viewing a Track (p. 413)

About Track Limits in a DVD

A DVD can have a combination of up to 99 tracks, stories, and slideshows. Each track can contain up to:

- 9 video streams, used as angles or alternate video
- 8 audio streams for different soundtracks
- 32 subtitle streams for alternate text, alternate languages, or buttons over video
- 99 chapter markers used primarily to define points in the track that can be jumped to
- 255 cell markers used for a variety of purposes, such as button highlights and DVD@CCESS (this includes chapter markers, which are also cell markers)
- 98 stories (assuming there are no other tracks or slideshows), each defining an alternate track playback by treating each chapter marker as a clip that can be moved or skipped as needed

Working with a Track's Assets

You can add multiple video or audio assets to each stream in a track. You can even trim each asset's start and end points to choose the parts of it you want to use. While this allows for a lot of flexibility when creating your tracks, it is not a substitute for using a video editing application, such as Final Cut Pro, to edit the clips into an asset to add to your project.

You need to use a video editing application to add effects such as dissolves, wipes, and keys to the video. With this kind of editor, you can precisely choose each clip's start and end points—the trimming capability of DVD Studio Pro is restricted to Group of Pictures (GOP) boundaries only, making it much harder to trim a clip exactly where you would like. Also, DVD Studio Pro can't mix multiple audio assets together as you can with an editor.

How Many Tracks Should You Have?

Depending on your intended result, your project may have one long track, or you may choose to divide your material into multiple tracks that can be played separately or linked together.

For example, if you are working on a long project that you expect the viewer to watch from beginning to end, using one long track is the best option. This eliminates any pauses that the viewer may encounter while the DVD player jumps from one track to another. Even if your project contains several independent segments that the viewer would not watch one after the other, you can still use a single track and set actions on the markers to break the track into the smaller segments. Or, you can create separate tracks for each segment—whichever method is easiest for you to manage.

In some cases, such as a track with a mixture of still images and motion clips, you may need to use multiple tracks to work around the 99 chapter marker-per-track limit.

If you think you may need to replace some segments in your project later on—for example, to customize for various countries or to update outdated sections—you may find it easier to replace these segments if they are separate tracks.

About Subtitle Streams

Subtitles can be created in the Track Editor, or they can be imported from other applications. They can be used to overlay dialogue text over the video stream, or to overlay simple graphics. Subtitles can also be used to place buttons over the video; the viewer can select these buttons just as they would on a menu.

See Creating Subtitles for information on working with subtitles.

DVD Studio Pro Tools for Working with Tracks

DVD Studio Pro provides two primary tools for configuring your tracks: the Track Inspector and the Track Editor.

- The *Track Inspector* contains general track settings, such as its aspect ratio, what happens when the track finishes, the remote control settings, and DVD@CCESS settings.

- The *Track Editor* is where you add and manage your video and audio assets, as well as your subtitles. You can also add markers for use as chapter points and other functions.

There is also a Marker Inspector you use when working with markers and a Clip Inspector you use when working with individual clips within a track.

Note: An asset used within a track is considered a clip. This distinguishes what is used in the track (which may be just a part of the asset) from the original asset.

Together, these powerful tools allow you to make the tracks into exactly what you need.

Creating Tracks

There are several methods you can use to create a track. Once it has been created, you can open it in the Track Editor, using the controls there and in the Track Inspector to configure it.

By default, a new project contains one menu and one track. Depending on your project, you will probably want to add additional tracks. There are several ways to add a track to your project.

To create a track

Do one of the following:

- Drag a video asset or a video/audio asset pair to the Menu Editor and choose an option that creates a new track from the Drop Palette. You can drag the assets from the Assets tab, the Palette, or a Finder window. See Options in the Drop Palette for Standard Menus and Options in the Drop Palette for Layered Menus for details on the options in the Menu Editor's Drop Palette.

  In all cases, a track is created with the video placed in the V1 stream and the audio (if used) placed in the A1 stream. The track has the same name as the video asset.

- Drag a video asset or a video/audio asset pair to an empty area of the Outline or Graphical tab. You can also drag the assets to the disc name or the Tracks heading.

  In all cases, a track is created with the video placed in the V1 stream and the audio (if used) placed in the A1 stream. The track has the same name as the video asset.

  Dragging a video or video/audio asset pair to an existing track in the Outline or Graphical tab appends the assets to the track's existing assets.

- Convert a slideshow to a track. The still images and audio are added to the track's V1 and A1 streams. See Converting a Slideshow to a Track for slideshow details.
- Click Add Track in the toolbar. Each track created this way is empty.
- Press Command-Control-T. This also creates an empty track.

Opening Tracks

To configure a track, you need to open it in the Track Editor. You can select the track you want to work with in the Outline tab, the Graphical tab, or the Track Editor.

To open a track in the Track Editor

Do one of the following:

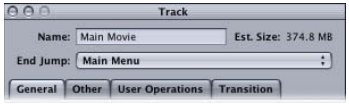
- Double-click the track you want to configure in the Outline or Graphical tab.
- Choose the track from the Track Editor's Track pop-up menu. The track appears in the Track Editor and the Track Inspector changes to display its properties.

Setting Track Properties

The Track Inspector contains a top section and four tabs: General, Other, User Operations, and Transition.

Settings at the Top of the Track Inspector

There are three settings at the top of the Track Inspector.



- *Name:* Enter the name for the track. If a track is created because a video asset was dragged to the Menu Editor, the Outline tab, or the Graphical tab, it is automatically named the same as the video asset. In other cases, the track is named "Track _" where "_" is the next available number.
- *Est. Size:* Shows the approximate amount of disc space the track will require. This takes into account all of the assets assigned to the video, audio, and subtitle streams.
- *End Jump:* Choose the element to jump to once the track finishes playing. If you don't make this selection, the DVD player will be unable to continue playing the title when it reaches this point. If the track was created by dragging an asset to the Menu Editor, the End Jump is automatically set to jump back to that menu.

General Tab in the Track Inspector

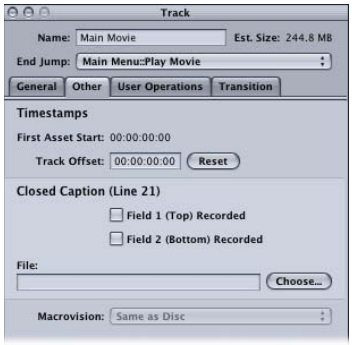
The General tab in the Track Inspector contains the following settings.

- *Resolution:* Choose the track's resolution.
  - *For SD projects:* The resolution is either 720 x 480i (NTSC) or 720 x 576i (PAL).
  - *For HD projects:* You can choose from any of the supported resolutions, as long as no video assets have been assigned to the track. You cannot change the resolution once a video asset has been assigned to the track. (You can change the resolution if the track only contains still assets.) The resolution automatically changes to match the track's V1 stream video resolution if it matches one of the supported resolutions. DVD Studio Pro Preferences includes a setting for the default resolution (which also applies to menus and slideshows).
- *Display Mode:* Set the aspect ratio for this track (4:3 or 16:9), and with 16:9, choose how it displays on a 4:3 monitor. The aspect ratio of the video assets must match this setting.
- *Pre-Script:* The script you choose in this pop-up menu will run as soon as the track is selected. The script determines whether to play the track or configure the DVD player before playing it. See Creating Scripts for information on scripts.
- *Wait:* You can set how long the DVD player shows the last frame of the track's video before exercising the End Jump setting.
  - *None:* Immediately jumps to the End Jump setting.
  - *Seconds:* Shows the track's last frame for the number of seconds you enter.
  - *Infinite:* Shows the track's last frame indefinitely.
- *Remote Control:* Use these pop-up menus to set what happens when the viewer uses the remote control buttons on the remote control. See Remote Control Settings for more information.

- *Display Condition:* Select this checkbox to set display conditions to control whether this track should appear or not, and to define what should appear if not this track. See Display Condition for more information. Select the Apply to Stories checkbox to also have these display conditions apply to stories based on this track.

Other Tab in the Track Inspector

The Timestamps settings in the Other tab in the Track Inspector applies to both SD and HD projects. The other settings in the tab apply only to SD projects.



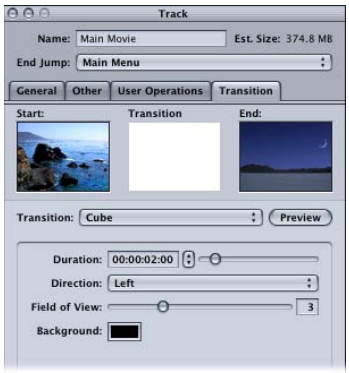
- *Timestamps:* Shows the start timecode of the first video asset in the V1 stream. You can also enter a track offset that is used in place of the first video asset's timecode when you choose Asset-Based Timecode in the Track Editor. See Timecode in the Timeline for more information.
- *Reset:* Click to change the track offset back to 00:00:00:00, allowing the first asset start time to be used for the timeline (if you are using asset-based timecode in the Track Editor).
- *Closed Caption:* SD projects only. Use these settings to assign a closed caption file to this track. See Line 21 Settings for Closed Captions for more information.
- *Macrovision:* SD projects only. This setting allows you to override the disc's Macrovision copy-protection settings for this track. If you have not enabled the Macrovision settings for the disc in the Disc Inspector, setting this to one of the three types automatically enables Macrovision for the disc. See About the Macrovision Settings for more information.

User Operations Tab in the Track Inspector

The User Operations tab is the same as those in other DVD Studio Pro Inspectors, and is discussed in User Operations.

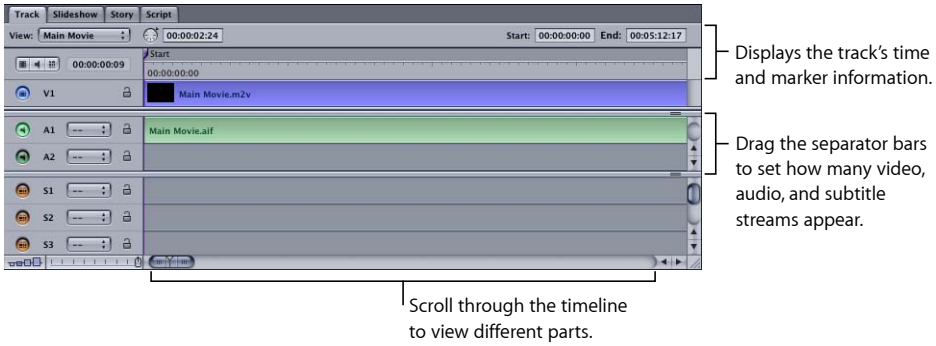
Transition Tab in the Track Inspector

The Transition tab is the same used in the Clip Inspector when a still clip is selected. See Transition Tab in the Track and Clip Inspectors for details on the Transition tab.

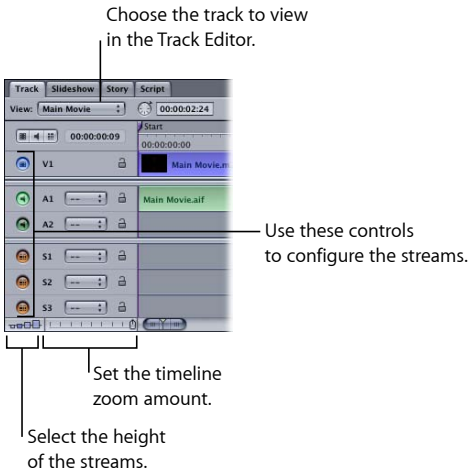


About the Track Editor

The streams are the heart of the Track Editor. In these parallel areas, you define the video, audio, and subtitle assets to be used in your tracks, and their relationship to one another.



The left side of the Track Editor contains the controls to configure the streams.



Within the Track Editor, timescales provide different ways to obtain timing information about the tracks. See Understanding Time Information in the Track Editor for more details.

Configuring the Track Editor

You can configure the Track Editor to suit your needs. You can set the size of the streams, how many of each stream type appear, and the timeline zoom amount.

Viewing the Streams

A track can contain up to 49 streams total, but viewing this many streams at once requires some effort. It's unlikely that you'll need to view more than ten streams at once; depending on the types of projects you create, you may use only two or three streams. There are three ways to control how many streams appear.

- You can change the size of the Track Editor's quadrant. You can even drag the Track tab into its own window. See Working with the Quadrants for more information.
- You can use the Track Editor's separator bars to control how many of each stream type appear. For example, if you do not plan to add subtitles, you can hide the subtitle stream area by dragging the separator bar above the subtitle area to the bottom of the window.
- You can select a different stream height. This changes the height of the streams as they appear in the Track Editor. This can be useful if you want to see larger or smaller thumbnails of the video at the markers.

Using the Stream Configuration Buttons

The Track tab includes a set of controls that you can use to quickly change which streams appear. The size of the Track tab determines how many streams appear.

To choose which streams appear

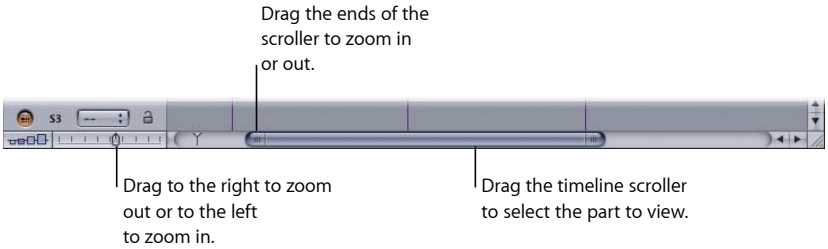
Do one of the following:

- Click the video icon to show only video streams.
- Click the audio icon to show only the V1 stream and the audio streams.
- Click the subtitle icon to show only the V1 stream and the subtitle streams.

If you select more than one of these views at the same time, the separator bars move to show as many of the selected streams as possible. Once you select one of these views, you can drag the separator bars to customize the stream types that are displayed.

Setting the Timeline Zoom

The Track tab contains a zoom control you can use to expand or contract the timeline. When working with large projects, you often need to be able to expand the timeline in order to set a marker or insert a subtitle. Using the zoom control in conjunction with the scroller at the bottom of the timeline allows you to configure the timeline so that it provides enough detail to work with.



To use the zoom control

Do one of the following:

- Drag it to the right to zoom out, showing more of the timeline. If the playhead is not visible, the timeline scroller automatically jumps to a position that does show it.
- Drag it to the left to zoom in, showing less of the timeline but more detail in the part that shows. If the playhead is not visible, the timeline scroller automatically jumps to a position that does show it.

Hold down the Shift key while dragging the zoom control to prevent the scroller from automatically changing its position to show the playhead.

You can also set the timeline zoom using keyboard shortcuts.

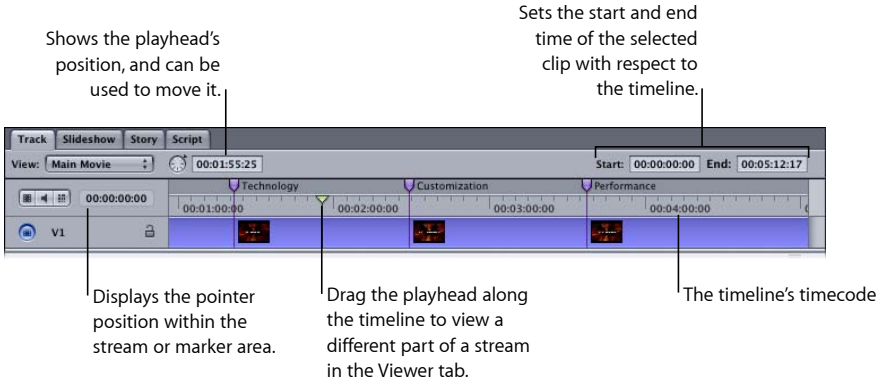
To zoom using keyboard shortcuts

Do one of the following:

- Press Command-Hyphen (-) to zoom out on the timeline. If the playhead is not visible, the timeline scroller automatically jumps to a position that does show it.
- Press Command-Shift-Hyphen (-) to zoom out without moving the scroller to show the playhead.
- Press Command–Equal Sign (=) to zoom in on the timeline. If the playhead is not visible, the timeline scroller automatically jumps to a position that does show it.
- Press Command–Shift–Equal Sign (=) to zoom in without moving the scroller to show the playhead.
- Press Shift-Z to zoom the timeline out to its maximum.
- Press Shift-Option-Z to fit the currently selected clip into the Track tab.

Understanding Time Information in the Track Editor

There are a variety of time-related elements that appear in the Track Editor. Some only display time information while others allow you to change the information. The time values help you identify the position of markers, clips, the playhead, and the pointer within the video, audio, and subtitle streams.



Timecode in the Timeline

The timeline's timecode is continuous throughout the track. You can choose from two sources for the timecode: zero-based and asset-based.

- *Zero-based timecode:* This timecode starts the timeline at 00:00:00:00. You cannot change the zero-based timecode, and the assets assigned to the V1 stream do not affect it.
- *Asset-based timecode:* This timecode can be based either on the timecode of the first clip on the V1 stream or on a value you enter in the Track Inspector.

To choose the timeline's timecode source

Do one of the following:

- Choose View > Timescale > Zero-Based Timecode or View > Timescale > Asset-Based Timecode.
- Control-click in the timeline, then choose either Zero-Based Timecode or Asset-Based Timecode from the shortcut menu.

The pointer position, playhead, and start and end timecode values change to match the timecode source you choose.

If you choose the asset-based timecode source, you can also choose whether to use the clip's timecode or a value you enter.

To configure the asset-based timecode source

1 Choose Asset-Based Timecode as the timecode source for the Track Editor's timeline.

2 Click the Other tab in the Track Inspector. If the Inspector is not showing the track properties, select the track's name in the Outline tab, its tile in the Graphical tab, or click an empty area in any of the Track Editor streams.

3 Do one of the following:

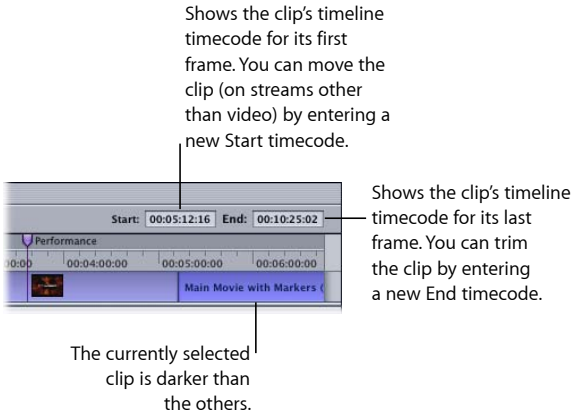
- *To use the timecode from the first clip in the V1 stream:* Click the Reset button. This sets the Track Offset value to 00:00:00:00, which forces the timeline to use the clip's timecode.
- *To set the timecode to start at a specific value:* Enter a new timecode value in the Track Offset field. The timeline's first frame is set to this number.

Being able to force the timeline's timecode to start at a specific value can be useful whenever you are importing a marker list or subtitle file that is based on timecode different from the zero-based or asset-based values.

Note: For NTSC projects, the type of timecode in the first asset—drop frame or non-drop frame—determines the type of timecode for the timeline.

Clip Start and End Timecode

Timecode start and end values appear when you select a clip (video, audio, or subtitle) in one of the streams. These values indicate the position of the clip with respect to the timeline's selected timecode source. Depending on the stream, you can enter new start values to reposition the clip or new end values to trim the clip's size.

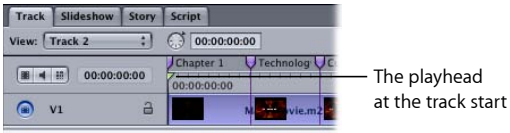


See Editing Video and Audio Clips for more information.

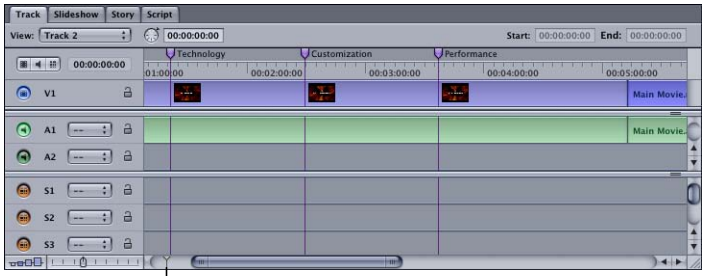
Playhead

The playhead provides a visual indication of what part of the track is currently playing in the Viewer tab. When you play the track, the playhead moves along the track's timeline. It also provides a way to scroll across the timeline and see the video in the Viewer tab.

The playhead is in the timeline's timecode area. With new tracks, the playhead is located at the track's start.



A playhead icon appears in the timeline scroller area to let you know where it is relative to the part of the timeline being shown, which is useful if you cannot see the playhead in the Track Editor. For example, if the playhead icon appears to the left of the scroller, that means the playhead is at a point in time before the clips currently visible in the timeline.



The playhead appears in the timeline's scroller.

Positioning the Playhead by Dragging

You can drag the playhead along the timeline to see the video (and subtitle, if applicable). This is useful when placing markers because it allows you to see the actual video frame.

As you drag the playhead along the timeline, the timecode of its current position appears in the playhead timecode entry. A line extends across all of the streams, indicating the playhead position.

The playhead's current timecode appears here when you drag the playhead.

You can also click anywhere in the timeline to move the playhead to that position and have the video at that position appear in the Viewer tab. Playback starts at this point if you click the Play button in the Viewer tab.

Positioning the Playhead by Using Keyboard Shortcuts

There are a number of keyboard shortcuts that you can use to position the playhead.

- *Left Arrow and Right Arrow keys:* Move the playhead one frame at a time.
- *Shift–Left Arrow and Shift–Right Arrow keys:* Move the playhead one second at a time.
- *Option–Left Arrow and Option–Right Arrow keys:* Move the playhead one GOP at a time.
- *Control–Left Arrow and Control–Right Arrow keys:* Move the playhead to the next marker.
- *Command–Left Arrow and Command–Right Arrow keys:* Move the playhead to the start or end of the selected clip.

- *Up Arrow and Down Arrow keys:* Move the playhead to the next clip edge (includes all clips in all streams) or marker.
- *Home and End keys:* Move the playhead to the start or end of the timeline.

See Keyboard Shortcuts for a complete list of keyboard shortcuts.

Positioning the Playhead by Entering a Timecode Value

You can also set the playhead's position by entering a timecode value in the playhead position entry. The playhead jumps to its new position.

Enter a timecode to move the playhead to.

See About the Viewer Tab for more information on using the Viewer tab.

Supported Asset Types

The Track Editor's streams contain the video, audio, and subtitle assets. You can add one or more assets to each stream. Each stream has several properties you can set, such as its language and whether or not it is enabled.

See Creating Subtitles for information on working with the subtitle streams.

In addition to assets that are already DVD-compliant, you can add assets supported by the DVD Studio Pro integrated MPEG encoder. These assets are encoded once they are added to your project.

See Encoding Video Materials for DVD for information on supported video assets, Preparing Audio Assets for information on supported audio assets, and Using the Integrated MPEG Encoder for information on the assets the integrated MPEG encoder supports.

Video Assets for SD-Based DVD Video Streams

All video assets on an SD-based DVD stream must use the same aspect ratio (4:3 or 16:9), the same video standard (PAL or NTSC), and the same MPEG type (SIF MPEG-1 or full D1 MPEG-2, for example).

Note: All QuickTime video assets you import into an SD project are encoded as full D1 MPEG-2 assets and can be mixed with still images in a video stream.

About Segmented MPEG Files

The segmented MPEG files created by some third-party encoders do not import correctly into DVD Studio Pro. Some encoders segment their large encoded files into 1 GB files. When imported into DVD Studio Pro, only the first 1 GB segment is imported. You need to combine the files into a single file before importing the asset into DVD Studio Pro. There are several third-party applications that can be used to combine a segmented MPEG file into a single file.

Video Assets for HD-Based DVD Video Streams

All assets on an HD-based DVD stream must use the same aspect ratio (4:3 or 16:9), the same resolution, the same video standard (PAL or NTSC), and the same MPEG type (MPEG-2/HDV or H.264).

All non-HDV and non-H.264 QuickTime video assets you import into an HD projects are encoded as MPEG-2.

Note: Because HDV is actually HD MPEG-2, you can combine HDV assets with other HD MPEG-2 assets, including those encoded from the integrated MPEG encoder, as long as they are the same resolution.

Still Assets for Video Streams

You can add still images to a video stream to either manually create a slideshow or create a stream with mixed motion and still video. Stills can be added to all SD and HD tracks except those using SIF, 1/2 D1, cropped D1 MPEG-2, or H.264 format assets.

Still asset clips in a stream must each be at least 15 frames long for NTSC projects, or 12 frames long for PAL projects.

Note: To have still assets with shorter durations, you can edit them into a video asset using an external video editor.

Still clips can have a transition added to their end. The transition controls what happens at the end of the still clip—for example, you can configure it to dissolve or wipe to the next clip, whether the next clip is a video or still clip. See Using Still Clip Transitions for more information.

Assets for Audio Streams

All audio assets within a stream must be the same type (AC-3, AIFF, MPEG-1 layer 2, and so on) with the same number of bits (16, 20, or 24), the same sample rate (48 kHz or 96 kHz), the same bit rate (when using compressed audio), and the same channel configuration; for example, stereo or 5.1 surround. (The streams within a track do not have to match each other—only the assets within a stream must match. For example, the A1 stream can use AC-3 audio and the A2 stream can use AIFF audio.)

Using AAC Audio Files from the iTunes Store

DVD Studio Pro is able to import and use AAC format audio files purchased from the iTunes Store as long as the computer you are using them on is authorized to use them. If you import iTunes Store files that the computer is not authorized to use, DVD Studio Pro plays silence when it encounters those files. Additionally, if you select and try to play an iTunes Store file that the computer is not authorized to play in the Audio tab in the Palette, DVD Studio Pro plays silence.

Adding Video and Audio Assets

If you created your track by dragging either a video asset or a video/audio asset pair to the Menu Editor, the Outline tab, or the Graphical tab, it already contains video and audio clips. If you created your track using the Add Track icon in the toolbar, it will be empty.

In either case, you can add additional assets to the streams and even trim each clip's start and end points.

To add an asset to a stream

- Drag the video or audio asset from the Assets tab, the Palette, or a Finder window to the stream where you want to place it.

With the V1 stream, DVD Studio Pro automatically ensures there is always a clip at its beginning (if one has been assigned), and there are no gaps between the clips. With the other video streams, the clips can only be positioned at markers. Audio and subtitle clips can be positioned anywhere on the stream and there can be gaps between them.

Adding Audio Assets Automatically

When you enable the "Find matching audio when dragging" setting in the Track pane in DVD Studio Pro Preferences, audio assets are automatically added to a track when video is added.

When you add a video asset to the V1 stream, DVD Studio Pro checks to see if there is an audio asset with the same base name in the same folder. If there is, it is automatically added to the A1 audio stream.

The start of the audio clip will be the same as the video clip. If any audio already exists in the A1 stream where the new audio clip needs to go, it is trimmed or moved as necessary.

Note: Hold down the Command key after you start dragging to temporarily override the "Find matching audio when dragging" preferences setting.

Adding AC-3 Audio Assets

AC-3 audio assets are the only DVD Studio Pro–supported audio asset type that actually have embedded timecode. This can help when you want to maintain sync between the video and audio.

To add an AC-3 asset using its timecode

- Hold down the Option key, then drag the AC-3 audio file from the Assets tab to an audio stream in the Track Editor.

Note: Because the file must be parsed to determine its embedded timecode, an AC-3 file's timecode is only available when you drag it from the Assets tab, and not from the Palette or a Finder window. Drag the AC-3 file to the Assets tab first and then from there to the Track Editor.

When you add an AC-3 asset to an audio stream while holding down the Option key, DVD Studio Pro checks to see if its timecode is *coincident* with the V1 stream's timecode. In other words, it checks to see if the AC-3 asset has timecode that falls within the timecode range of the video asset.

- *If it is coincident:* The AC-3 asset is placed in the stream so that it is in sync with the video.
- *If it is not coincident:* The AC-3 stream is placed at the beginning of the stream.

Note: If the V1 stream has more than one video clip, the AC-3 timecode is ignored. It is also ignored if the audio stream you drag it to already has an audio clip.

Using Multiple Copies of a Clip

You can use a clip multiple times in the same stream or you can drag the clip to other streams.

To copy a clip within a stream

- Option-click the clip and drag it to an empty location in the stream.

You can treat the clip's copy the same as any other clip in the stream.

To copy a clip to a different stream

Do one of the following:

- Option-drag the clip to the stream that you want to copy it to. You can position it as needed.
- Shift-Option-drag the clip to the stream that you want to copy it to. The clip is constrained to use the same start time as the original.

The original clip is not affected, and remains in its location.

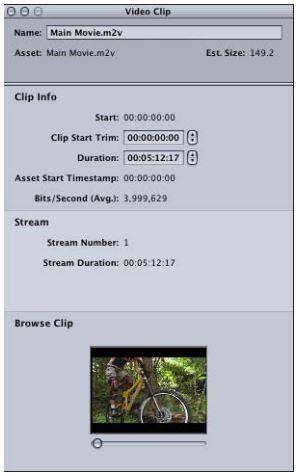
Copies of the original clip take up as much disc space as the original clip. If the size of your project is an issue, you may want to simply reuse the original clip by setting markers and creating scripts to access the clip from another project element.

Viewing a Clip's Properties

When you select a clip in one of the Track Editor's video or audio streams, the Clip Inspector appears.

To accommodate the additional settings used to configure transitions, the Clip Inspector used for still clips contains two tabs: General and Transition. The General tab contains the same information and settings as with video clips. See Using Still Clip Transitions for information on the Transition tab.

Note: Selecting a clip in a subtitle stream opens the Subtitle Inspector. See Creating Subtitles for information on subtitles.



The Clip Inspector shows information about both the clip and the stream.

Settings at the top of the Inspector

- *Name:* Enter a name for the clip. This name applies to the clip in this track's timeline only—it does not affect the asset's name in the Assets tab.
- *Asset:* Shows the clip's actual filename.
- *Est. Size:* Shows how much disc space this clip requires.

Clip Information and Settings

- *Start:* Shows the clip's start time in the stream.

- *Clip Start Trim:* Choose the part of the asset that the clip should use. Enter an amount of time by which to trim the clip's beginning. This affects the clip's overall length. When you enter a new Clip Start Time, the clip repositions itself on the timeline so that it begins at the same time, with the clip's end moving to its new position.
- *Duration:* Shows the clip's length. You can enter a new length to trim the end of the clip.

  Note: When you import a QuickTime asset that contains both video and audio, you may find that their durations, as shown in the Clip Inspector, do not match exactly. This is often due to the DVD-Video specification's frame rate for the supported audio formats not dividing evenly into the video frame rate. This does not affect the lip sync between the audio and video streams or their playback and is purely cosmetic.
- *Asset Start Timestamp:* Displays the timecode of the asset's first frame.
- *Bits/Second (Avg.):* Shows the clip's bit rate information.

Stream Information

- *Stream Number:* Shows the stream's number.
- *Stream Duration:* Shows the stream's length.
- *Language:* For audio clips only; shows the stream's language setting. You can choose a different language from the pop-up menu. The new language is applied to the entire stream. See Setting Stream Properties for more information.

Browse Clip

For video clips only. You can drag the slider under the thumbnail image to scrub through the clip's video.

Removing a Clip from a Stream

There are several ways you can remove clips from a stream.

To remove a clip from a stream

Do one of the following:

- Click the clip to select it, then press the Delete key.
- Control-click the clip, then choose Delete Media Clip from the shortcut menu.

These methods remove the clip from the stream, but the asset remains in the Assets tab. The actual asset's file is not affected.

Editing Video and Audio Clips

You can trim the start and end of a clip, which is useful when you need to remove a portion of an asset for artistic reasons (such as a bumped camera). It is important to understand that video clips in DVD Studio Pro are trimmed based on GOP boundaries—you cannot choose a specific frame to trim to. The typical GOP (Group of Pictures) size for NTSC video is 15 frames—for PAL video it is 12 frames. This means you may have to choose between trimming a little too much or not quite enough. If you need to trim a clip precisely, you should use a video editor to make the trim, and then bring the asset back into DVD Studio Pro.

You can trim audio clips by frames, making it possible to trim off a popping noise.

Trimming can also be a way to use a small part of a longer asset. Only the part of the asset that is in the stream is included in the final disc size.

About the V1 Stream

The first video stream, V1, has requirements different from the other streams. DVD Studio Pro automatically ensures these conditions are met.

- The first clip must be at the beginning of the timeline. There cannot be a gap between the timeline's first frame and the first frame of the V1 clip. All other streams, including the other video streams, can have their first clip start anywhere in the timeline.
- You cannot have gaps between clips in the V1 stream. All other streams can have gaps between their clips.
- When building the project, the track ends at the last frame of video in the V1 stream. Any streams that have clips extending beyond the V1 clips are automatically truncated by the build process.

Trimming and Positioning Clips

There are several methods you can use to trim and position a stream's clips within the Track Editor.

To trim a stream's clip by dragging

1 Position the pointer over the end of the clip you want to trim. The pointer changes to a bracket with an arrow pointing in the direction you can trim.

2 Drag the clip's edge to its new position.

Note: You cannot trim a clip beyond the edges of the asset.

To help guide you when trimming your clip, drag the playhead to the point you want to edit to. A vertical line appears across all streams, which you can use as a guide to trim an edge to. Be sure to use the timeline zoom feature to provide a close-up view of the area you're editing.

Use care not to lose your video and audio synchronization when trimming. Instead of dragging, you can enter values in the Start and End boxes at the top of the Track Editor and the Duration and Clip Start Offset entries in the Clip Inspector to trim a clip more precisely so that you can repeat exactly the trim on other clips.

To use the start and end values to position and trim a clip

1. Select the clip you want to trim. Its start and end values appear in the Track Editor's Start and End boxes.
2. Enter a new Start time. The beginning of the clip moves to that time.

   This moves the entire clip, but does not actually trim it.
3. Enter a new End time. The end of the clip is trimmed to that time.

To use the Clip Inspector to trim a clip

1. Select the clip you want to trim.

   The clip appears in the Clip Inspector.
2. Enter a new Clip Start Offset to trim the clip's start.

   The clip's start position on the timeline is not changed—only its end position is moved to match its new duration.
3. Enter a new Duration value to trim the clip's end.

Clip Conflicts

There are a number of rules to keep in mind when you trim and position a clip.

Video Clips

Dragging clips to the V1 stream is different from dragging audio clips. In part this is due to the requirement that there can be no gaps in the V1 stream, and there must be a clip at its beginning.

The following situations cause video clips already in the V1 stream to move. This can cause problems if the video clips have associated audio or markers because they do not move with the video.

- *If you drag a video clip to the start of a V1 stream that already has a clip assigned:* The new clip becomes the first clip and the original one (and any that follow it) shuffle down the timeline.
- *If you drag a video clip to the point where two existing video clips meet in a V1 stream:* The new clip is inserted between them.

- *If you drag a video clip to the stream, and the "Find matching audio when dragging" preference setting is enabled:* The audio in the A1 stream is trimmed or moved to accommodate the new video clip, even if that clip does not have matching audio. This maintains sync between the track's existing video and audio clips.

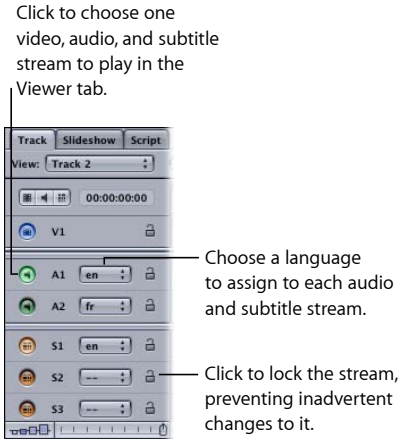
Audio Clips

Because audio clips can be placed anywhere in their audio streams, the results are different from those you get when working with video clips.

- *If you drag an audio clip to any open area within an audio stream:* The clip is placed there. If the open area is not long enough to hold the whole clip, the clip's end is trimmed so that it will fit. Unlike video clips, audio clips do not move unless you move them intentionally.

Setting Stream Properties

Each stream has a few settings you can use while configuring it.



Each stream has a button at the far-left side of the Track tab that you can click to enable that stream when you play the track in the Viewer tab. You can choose one video, and optionally, one audio and one subtitle stream.

Each audio and subtitle stream in a track can have a language assigned to it. When the track plays, it can select a stream based on the DVD player's language setting. If no suitable stream is found, the player plays the first stream.

Note: The Languages area of the Outline tab and the Add Language icon in the toolbar are used when creating multiple-language menus and are not used by the Track Editor. See Setting Up Menus for the Languages for more information.

You can protect a stream from accidental changes by clicking its lock icon. When it is open (unlocked), you can make changes to the stream; when the lock is closed, you can't. You can still select it for previewing and assign a language to it, but you cannot make any changes to its clips.

To lock all streams

- Choose Project > Timeline > Lock All Streams (or press Shift-F4).

Exporting an MPEG Clip

You can export the contents of the V1 stream as an MPEG file. This can be useful in some situations:

- If you have a long video asset and want to make a separate asset of a small part of it, you can add the asset to the stream, trim it to the size you want, and export it as a new asset. You can use this asset as you would any other asset. For example, you could use it as a menu background.
- You can edit multiple assets into the stream, and then export them as a single MPEG file.

  Note: You cannot export the stream as an MPEG file if the stream contains still images or uses H.264 format clips.

To export an MPEG file from the V1 stream

1. Configure the stream as needed.
2. Do one of the following:
   - Choose File > Export > MPEG File.
   - Control-click the stream, then choose Export MPEG File from the shortcut menu.
3. Enter a name and select a destination for the file in the Save Stream dialog that appears, then click Save.

When exporting a large asset, be sure you have sufficient disk space to hold the file.

Working with Markers

You can add up to 255 markers to a track, although a maximum of 99 can be set as chapter markers. Each marker has its own properties that define its purpose. Markers can be used to:

- Identify chapter points that the viewer can skip to when viewing the title
- Define when buttons appear over the video stream
- Identify the dual-layer break point when creating dual-layer projects
- Identify points in the stream that can be accessed by buttons and scripts

- Identify points where mixed-angle tracks can start
- Configure a DVD@CCESS operation to launch once the viewer reaches the marker point while playing the title
- Set a jump to another element in the project once the marker reaches its end. This is most often used by scripts that are set to play a portion of the stream and then return to another place in the project.

There are three ways to place markers on your track:

- You can manually place the markers along the track's timeline.
- If you are editing your video using Final Cut Pro 3.0.2 or later or Final Cut Express, you can place the markers as part of the editing process. These markers are automatically imported into DVD Studio Pro when you import the video asset. See Adding and Configuring Markers in Final Cut Pro and Final Cut Express for more information.
- You can import a text file that contains a list of markers.

With all three methods, you can always edit the markers' position and attributes as needed.

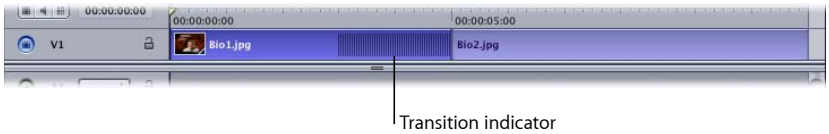
About Marker Placement

Markers can only be placed on Group of Pictures (GOP) boundaries. Because of this restriction, you cannot precisely position a marker on the exact frame you want to—you often need to set the marker either a little early or a little late. The length of the GOP depends on the MPEG encoder's settings (NTSC systems commonly use a GOP size of 15 frames and PAL systems commonly use a GOP size of 12 frames). This means that, unless you embed markers with a video editor, you may need to set a marker as much as 6 or 7 frames from where you'd like.

If you import markers from a timecode list, the markers are moved to a GOP boundary when they are imported. The Track pane in DVD Studio Pro Preferences lets you choose how the markers are placed. See Track Preferences for more information.

If you import a video asset edited with a version of Final Cut Pro or Final Cut Express that supports chapter markers, the integrated MPEG encoder automatically adds GOP boundaries at the marker frames, so the markers end up positioned exactly where intended.

If you convert a slideshow to a track, each still clip has a marker placed at its beginning. The markers are named the same as the still asset used for its clip. These markers retain any pause and DVD@CCESS settings that may have been set in the Slideshow editor. If any slides use transitions, the transitions appear as a shaded area in the timeline with a cell marker at their beginning.



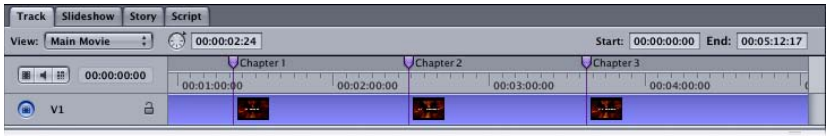
You can configure the transition by selecting the clip and making changes in the Clip Inspector's Transition tab. If a still with a transition also has a pause, the marker for the next clip is placed at the beginning of the transition instead of at the next clip's start. See Using Still Clip Transitions and Converting a Slideshow to a Track for more information.

See Working with GOP Settings for more information about GOP structures, and Adding Markers to Your Video for information on using Final Cut Pro or Final Cut Express to add markers to a clip.

Creating and Editing Markers

Each track always contains a chapter marker at its beginning. You can add up to 98 additional chapter markers to a track.

Markers appear along the top of the timeline display. A vertical line extends across all streams at the position of each marker.



To add a marker to a track

Do one of the following:

- Click in the area above the timeline display. A marker is added at the point where you clicked.
- Position the playhead at the point where you want to add the marker, then press M.

By default, the marker is set to be a chapter marker and is purple. See About the Marker Types for more information about the marker types.

Depending on the currently selected stream size, a thumbnail image of the frame located at the marker point appears in the video stream. You can modify the thumbnail image in the Marker Inspector. See Setting Marker Properties for more information.

The default marker's name is "Chapter _," with "_" being the next number available. The number is based on the order in which you create the markers, not on their location on the track. This means Chapter 4 may occur before Chapter 2. To avoid confusion, you should rename your markers in the Marker Inspector. See Setting Marker Properties for more information. The Track pane in DVD Studio Pro Preferences contains a setting you can use to control the names assigned to markers as they are created. See Track Preferences for more information.

When you have multiple clips in the V1 stream, you can also have markers placed at a stream's clip end (except for the last clip).

To add a marker to a clip's end

- Control-click the clip in the V1 stream to base the marker on, then choose Add Marker to Clip End from the shortcut menu to add a cell marker, or Add Chapter to Clip End to add a chapter marker.

You cannot add a marker to the end of the last clip in the V1 stream. See About the Marker Types for information on the difference between a cell marker and a chapter marker.

To set the playhead to a marker's position

- Control-click the marker, then choose Set Playhead Here from the shortcut menu.

This makes it easier to see the video at the marker's position. You can also hold down the Control key and use the Left Arrow and Right Arrow keys to jump from marker to marker.

To move a marker

Do one of the following:

- Drag the marker to its new position. The timecode of the marker's position appears next to the pointer timecode display as you move it.
- Enter a new time in one of the timecode boxes (zero-based or asset-based) in the Marker Inspector. See Setting Marker Properties for more information.
- Drag the slider underneath the video thumbnail in the Marker Inspector.

When you move a marker, the thumbnail image in the video stream changes to match the marker's new location.

To delete a marker

Do one of the following:

- Control-click the marker, then choose Delete Marker from the shortcut menu.

- Select the marker, then press the Delete key.

To delete all markers
Do one of the following:

- Choose Edit > Delete All Markers.
- Control-click in an empty part of the Track Editor's marker area, then choose Delete All Markers from the shortcut menu.

Adding Markers to a Track Without a Video Clip Assigned

You can add markers to a track even if you have not assigned a video clip to the track. You can also add markers beyond the end of the video clip, in anticipation of adding a video clip later. In these cases, because the GOP structure is unknown, you can place the markers at any frame. Once the video is added, however, the markers will need to be adjusted because most will not be at legal GOP boundaries.

DVD Studio Pro automatically readjusts the marker positions based on the Snap To setting in the Track pane in DVD Studio Pro Preferences.

What Happens to the Markers If You Move the Video?

When you place markers in the Track Editor with a video clip already present, the markers are automatically placed at GOP boundaries. If you move a marker, it jumps from one GOP boundary to the next, and therefore is always in a legal position.

If you move the video clip—for example, by trimming its start or dragging it to another position when multiple clips are in the V1 stream—the markers do not reposition to follow the video. There is also a good chance that at least some of the markers will no longer be at GOP boundaries. For this reason, you should be sure the video is in its final location before adding markers to it.

When you build your project, DVD Studio Pro verifies that all markers are on GOP boundaries, and that none are placed after the end of the V1 stream's video. A setting in the Track pane in DVD Studio Pro Preferences determines whether the build will quit if invalid markers are found, or if it will reposition markers to a GOP boundary and remove excess markers from the end of the track and continue with the build. See Track Preferences for more information.

Importing Markers from an Editor

When you edit your video asset in Final Cut Pro or Final Cut Express, you can add chapter markers that DVD Studio Pro uses to create markers on the track. If you have named the markers, DVD Studio Pro uses those names when it creates the markers.

How you add the video asset to your project determines what happens with the markers:

- *If you add the asset by dragging it to the Menu Editor:* You can choose any of the Drop Palette options that create a track. In addition to creating a track with the markers in place, some options create chapter index menus. The chapter index menu buttons are automatically linked to the track's markers.
- *If you add the asset by dragging it to a track:* You can import the markers from the Track Editor.

Note: The first marker in a track is always at the beginning of the timeline and is named "Start" when a track is created by dragging the video asset to the Menu Editor. It is not affected by imported markers. You can rename the marker as needed.

To use the Menu Editor to import an asset with chapter markers

1. Drag the video asset with markers to the Menu Editor. You can drag it to an existing button or to an empty area.
2. When the Drop Palette appears, choose an option that creates a track.
3. If you choose an option that creates a chapter index menu, select the template or layout style to use for the chapter index menu in the dialog that appears.

   DVD Studio Pro creates the chapter index menu and a new track. The chapter index menu contains a button for each marker. Depending on the number of markers and the template or layout style you select, there may be multiple chapter index menus, and each marker button may have the name and a thumbnail image of the video frame located at its marker. Each of these marker buttons is linked to the new track, which displays the markers along with their names.

To import chapter markers directly into a track

1. Drag the video asset with markers to the V1 stream of the Track Editor.

   If there are currently no markers in the track (other than the one at the start of the timeline), the clip's markers are automatically imported. If there are markers in the track other than the one at the timeline's start, you must manually import them.
2. Control-click the clip, then choose Import Embedded Markers from the shortcut menu.

   While this does not create chapter index menus, you can create them later by dragging this track from the Outline or Graphical tab to the Menu Editor. The advantage of this method is that you can add or edit the track's markers before creating the chapter index menus.

Importing Markers from a Text List

You can create a list of timecode points that DVD Studio Pro can import to create markers. The timecode values need to match the timecode of the track's video clip. The list of timecode values must be a plain text file; you can create it with TextEdit (as long as you save the file as plain text). If you create the list with a more complex word-processing application, be sure to save the file as a plain ASCII text file with no formatting. The file must follow these rules:

- Each marker must be on a new line that starts with a timecode value in the "00:00:00:00" format. These values identify the marker positions.
- After the timecode value, you can include a name for the marker. You can use a comma, space, or tab character to separate the timecode value from the marker name.
- Any lines that do not begin with a timecode value are ignored. This makes it easy for you to add comments to the list.
- The timecode values do not have to be listed in chronological order.

To import a marker list from a text file

Do one of the following:

- Choose File > Import > Marker List.
- Control-click in the Track Editor's marker area in the track you want to apply the marker list to, then choose Import Marker List from the shortcut menu.

Once the import is complete, a message appears stating how many markers were imported. The markers are placed on the timeline at GOP boundaries. The Track pane in DVD Studio Pro Preferences contains a setting that controls how the GOP is chosen. See Track Preferences for more information.

About the Marker Types

There are four types of markers you can have in the track. One marker can be one or more of these types. The color of a marker in the Track Editor indicates its type—if you configure a marker to be more than one type, the marker symbol splits to display the relevant colors.

The types of markers and their colors are:

- *Chapter:* Purple

- *Button highlight:* Orange
- *Dual-layer break:* Black dot in the marker's middle
- *Cell:* Green

You define the type of marker in the Marker Inspector. Additionally, you can set a marker to be a button highlight type by Control-clicking it and choosing Button Highlight Marker from the shortcut menu.

Note: Only chapter markers can be connected to from menu buttons and scripts.

Each marker has a duration that is determined by the distance between it and the next marker. This duration is especially important when using button highlight markers, because it determines how long the highlights display over the video, and when creating stories, because it determines the length of each story's segment. See Creating Buttons over Video and Introduction to Stories for more information.

Chapter Markers

By default, all markers you create start out as chapter markers. Viewers can jump to these markers by pressing the Previous and Next buttons on their DVD player's remote control. Because of this, even simple projects without a chapter index menu can benefit by having chapter markers added to the track because they provide a viewer with the ability to quickly skip through sections of a track.

Only chapter markers can be connected to from other project elements such as menu buttons and scripts, and a track's story can only use track sections defined by chapter markers. While a track can have up to 255 markers, it is limited to a maximum of 99 chapter markers.

Note: The Previous and Next buttons can act differently on different DVD players. See Getting Consistent Previous and Next Button Behavior for more information.

Chapter markers have an end jump setting. By default, this is set to Not Set, which actually means that playback will automatically jump to the next video frame. In almost all cases you will leave the End Jump set to Not Set; however, you may have non-standard situations where you need to set the End Jump to a specific element. In these cases, you are limited to a maximum of 106 chapter markers and individual end jump chapter settings. See Setting Chapter Marker End Jumps for more information.

Note: The DVD specification does not allow subtitles to extend across chapter markers. For that reason, subtitles that cross chapter markers are automatically split into multiple subtitle clips at each marker when you build your project.

Button Highlight Markers

You use button highlight markers when you want to have buttons display over the video on the track. These buttons are actually configured as part of a subtitle clip. The buttons appear once you reach the marker and disappear when you reach the next marker (unless it has also been configured as a button highlight marker). Often referred to as "buttons over video," this feature allows you to provide choices to viewers while they watch the track part of the title. See Creating Buttons over Video for more information on using buttons over video.

Important: There must be at least 1.5 seconds between a button highlight marker and the next marker.

Dual-Layer Break Markers

When you create a dual-layer title, you can set a marker to be used as the *dual-layer break point*, the point where the title splits between the first and second layer. Because the break point is often noticeable when playing the disc on a DVD player (the video temporarily freezes), you want to try to choose a place in the track where the freezing is not as noticeable. See About Choosing a Dual-Layer Break Point for details on choosing a dual-layer break point.

Cell Markers

All markers define a cell in the track. A cell marker is a marker that has no specific assignment. They are often added to a track to start a DVD@CCESS action or to provide a break point for a button highlight marker.

Setting Marker Properties

When you select a marker, the Marker Inspector appears. It has two tabs: General and User Operations.

See User Operations for details on the settings in this tab. Also see Getting Consistent Previous and Next Button Behavior for information specific to user operations and markers.

Settings at the Top of the Marker Inspector

The following settings are at the top of the Marker Inspector.

- *Name:* Enter the name for the marker. See Track Preferences for information on how DVD Studio Pro can automatically assign names to markers. A number is automatically appended to the name you enter if a marker with that name already exists on that track.

- *End Jump:* Choose the project element to jump to when the marker finishes playing (occurs just before the next marker is reached). This is typically left at "not set." In most cases, if you leave it at "not set," each marker is automatically connected to the next marker. This setting can be used by specialized projects and scripts that dynamically control which parts of the track plays. See Setting Chapter Marker End Jumps for more information.

General Tab in the Marker Inspector

The following settings are in the General tab of the Marker Inspector.

- *Thumbnail:* The thumbnail is the video frame where the marker is located. You can drag the slider beneath the thumbnail image to move the marker to a new position.
- *Save Still:* Click to save the thumbnail image as a video resolution TIFF file. You can import this file for use as a menu background or shape asset. This is useful as a way to create a still image from a frame of a video asset.
- *Zero-Based:* Shows the marker's timecode based on the timeline's zero-based mode (based on the timeline's first frame being 00:00:00:00). You can reposition the marker by entering a new value or using the arrows. The new position must correspond to a GOP boundary—the arrows jump one GOP at a time.
- *Asset-Based:* Shows the marker's timecode based on the timeline's asset-based mode (based on the timecode of the timeline's first clip or a value entered in the Track Inspector's Other tab).
- *Type:* Select the function to assign to the marker. You can select one or all functions. See About the Marker Types for information.
- *Wait:* Use this control to set how long the DVD player displays the last frame of the marker's video before exercising the End Jump setting.
  - *None:* Immediately jumps to the End Jump setting.

- *Seconds:* Shows the marker's last frame for the number of seconds you enter.
- *Infinite:* Shows the marker's last frame indefinitely.

- *Pause after each VOBU:* Select if you want playback to pause until the viewer presses the Play button, when it plays to the next VOBU (Video Object Unit) and pauses again. This is a way to pause the track's playback and wait for the viewer to start it again.

  The length of a VOBU varies depending on whether it is a still image or full-motion video. When you place a still image in the video stream, it lasts for one VOBU regardless of its duration. With video, a VOBU can be from 0.4 to 1 second long. For this reason, "Pause after each VOBU" is generally only used on markers at still boundaries. You should avoid using it on markers with video because it will cause the playback to stop about once a second.
- *DVD@CCESS:* Select to make the name and URL settings available for this marker, which allows you to add functionality to your title when played on a computer. See DVD@CCESS for more information.
- *Remote Control:* Choose the place in the project to jump to if the viewer presses the remote control's Menu button. See Remote Control Settings for more information on remote control settings.
- *Macrovision:* SD projects only. Choose the Macrovision setting to apply to this marker's video. See About the Macrovision Settings for more information on Macrovision copy-protection.

Introduction to Stories

A story is simply a way to rearrange the playback of the track cells defined by the chapter markers. You may want to create a version of a track that skips some objectionable content, or you may want to use a short piece of the track as a preview. A story does not increase the amount of disc space the track requires because it is simply playing the track's markers in a different order.

A story has access to the entire track, but it does not have to include it all. You can choose which chapter markers to include and in what order—you can even play a marker's video more than once.

Additionally, you can exclude and subtitle audio streams from a story. By default, a story has access to the same audio and subtitle streams that the track has access to, which can be a problem if your intention is to present a less objectionable version of the track by providing alternative audio and subtitle streams. By excluding selected audio streams, you can force the DVD player to play the alternate audio and subtitle streams.

Creating a Story for a Track

Because stories are associated with the current track, you need to make sure you select the correct track before creating the story.

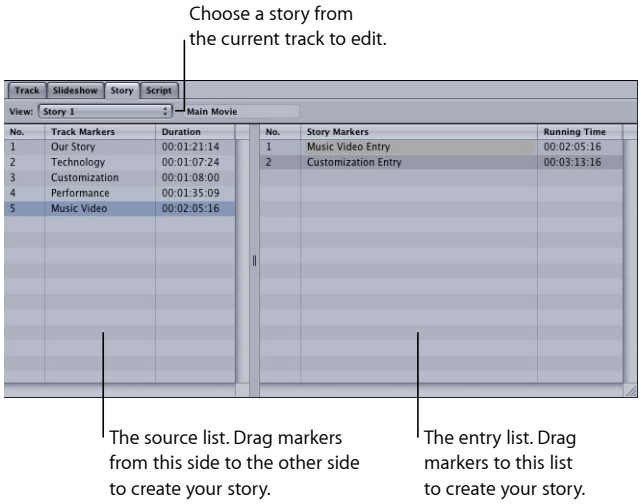
To create a story for a track

1. In the Outline or Graphical tab, select the track for which you want to create a story.
2. To create the story, do one of the following:
   - Choose Project > Add to Project > Story (or press Command-Shift-T).
   - Control-click in the Outline or Graphical tab, choose Add from the shortcut menu, then choose Story from the submenu.
   - Control-click the track, choose Add from the shortcut menu, then choose Story from the submenu.
   - Click Create Story in the toolbar.
3. Double-click the new story.

The Story Editor appears.

Using the Story Editor

The Story Editor is where you create your story.



The Story Editor contains two areas:

- The left area is the source list, which contains a list of all markers in the track. You cannot directly make changes to the source list.

- The right area is the entry list, where you create your story by dragging markers from the area on the left (the source list).

As you drag markers from the source list to the entry list, you add story entries. Each entry shows the source marker's name and the running time of the story, based on the duration of that marker and all markers ahead of it. A number is added to the end of the source marker's name if the marker appears more than once in the entry list.

To delete a marker from the entry list

- Select the entry, then press the Delete key.

The entry is removed from the entry list.

To change an entry in the entry list

- Control-click the entry, choose Change Chapter from the shortcut menu, then choose the marker you want to replace the entry with from the submenu.

You can also change a story entry's source marker in the entry's Story Inspector.

To change the order of the entry list

- Drag an entry to a new position.

The order of the entries in the entry list controls how the story plays. This makes it easy to rearrange the order if you inadvertently mix up a couple of markers.

Setting Story Properties

The Story Inspector has two tabs: General and User Operations.

See User Operations for details on the settings in this tab.

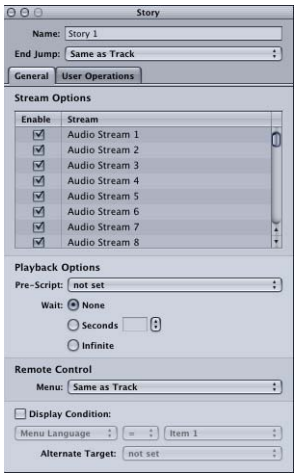
Settings at the Top of the Story Inspector

Following are the settings at the top of the Story Inspector.

- *Name:* Enter the name for the story.
- *End Jump:* Choose the project element to jump to when the story finishes playing. This is typically left at Same as Track, but can be set to any other element in the project.

General Tab in the Story Inspector

The Story Inspector appears when you select a story in the Outline or Graphical tab. If you select an entry or marker in the Story Editor, the Inspector changes to display details about that item. Select the story in the Outline or Graphical tab to switch back to the Story Inspector.



- *Stream Options:* Deselect the checkboxes to disable any audio and subtitle streams you do not want to be available when this story plays. This is useful when you don't want the story to have access to streams that might contain objectionable content.
- *Pre-Script:* The script you choose in this pop-up menu will run as soon as the story is selected. The script determines whether to play the story or configure the DVD player before playing it. See Creating Scripts for information on scripts.
- *Wait:* Use this control to set how long the DVD player displays the last frame of the story's video before exercising the End Jump setting.
  - *None:* Immediately jumps to the End Jump setting.
  - *Seconds:* Shows the story's last frame for the number of seconds you enter.
  - *Infinite:* Shows the story's last frame indefinitely.
- *Remote Control:* Choose what happens when the viewer uses the Menu button of the remote control. See Remote Control Settings for more information.
- *Display Condition:* Select this checkbox to set display condition settings to control whether this story should play or not, and to define what should play if not this story. See Display Condition for more information.

Setting Story Entry Properties

If you select a marker in the Story Editor's source list, the Marker Inspector appears, displaying the settings for that marker. See Setting Marker Properties for an explanation of this window.

If you select an entry in the entry list, the Story Marker Inspector appears.

- *Name:* Enter the name for the story entry. This does not affect the marker's name.
- *End Jump:* Choose the project element to jump to when the entry finishes playing (occurs just before the next entry is reached). This is typically left at "not set." In most cases, if you leave it at "not set," each story entry is automatically connected to the next entry. This setting can be used by specialized scripts that dynamically control which parts of the track play.
- *Zero-Based:* Shows the story entry's timecode based on the timeline's zero-based mode (based on the timeline's first frame being 00:00:00:00).
- *Asset-Based:* Shows the marker's timecode based on the timeline's asset-based mode (based on the timecode of the timeline's first asset).
- *Track Marker:* Choose a marker from the source list to assign to this entry.
- *Remote Control:* Choose the place in the project to jump to if the viewer uses the Menu button of the remote control. See Remote Control Settings for more information.

Simulating a Story

Simulating a story allows you to verify that it plays as expected.

To simulate a story

Do one of the following:

- Select the story, then choose File > Simulate Story, or press Command-Option-0 (zero).
- Control-click the story's name in the Outline tab or its tile in the Graphical tab, then choose Simulate Story from the shortcut menu.

These methods force the Simulator to start at this specific story instead of the First Play connection, as it does when you open it using the icon in the toolbar.

You can also start the Simulator from a specific story entry.

To simulate a story entry
Do one of the following:

- Select the story entry in the Story Editor, then choose File > Simulate Story Entry, or press Command-Option-0 (zero).
- Control-click the story entry, then choose Simulate Story entry from the shortcut menu.

Once the story starts playing, you can use the Simulator's controls to choose the streams to view (angle, audio, and subtitle).

See Simulating Your Project for information on using the Simulator.

Adding Alternate Video Streams

One feature unique to the DVD medium is the viewer's ability to switch between parallel video streams with continuous audio. Only one video stream at a time can serve as the active stream, but there can be as many as eight alternate streams, for a total of nine "camera angles." These can be different camera views, or angles, of the same subject, or they can be any other video sources.

For example, a concert video could use different camera angles for the alternate video streams, with cameras focusing on each musician. Stream V1, the main video stream, could be an edited version of all angles while streams V2 to V9 could be unedited versions of each musician. This would allow the viewer to choose whether to see the whole concert or focus on a specific aspect of it.

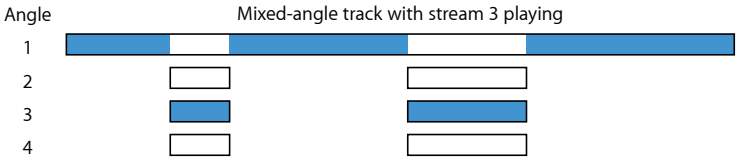
In another example, the V1 stream could contain the normal view of a business presentation, including the presenter, and the presentation's slides could be displayed up close on the V2 stream.

Multi-Angle and Mixed-Angle Tracks

DVD Studio Pro allows you to create either *multi-angle* or *mixed-angle tracks*. With a multi-angle track, the alternate video streams are the same length as the main stream. A mixed-angle track uses partial alternate video streams.

Authoring with multi-angle video is an exciting capability of the DVD medium, though there are some disadvantages, the main one being that multi-angle video streams consume a great deal of disc space. A DVD capable of holding 120 minutes of video has its play time reduced to 60 minutes if there are two video angles (120 divided by 2), and to 13.3 minutes if there are 9 video angles.

A space-efficient method of taking advantage of the alternate video streams is to build DVD projects that have a single video stream for most of their playing time, but that provide alternate streams in certain sections. This is known as using *mixed* angles.



About Alternate Stream Video Assets

If you want to switch between video streams while the DVD is playing, the DVD specification sets some restrictions on the alternate streams. They must be in the same MPEG format and have the exact same GOP structure as the main stream. It is strongly recommended that you use the same encoder for all streams to ensure they match exactly.

For multi-angle tracks, all streams, including the main one, must be the exact same length.

For mixed-angle tracks, you use markers to define one or more sections of the main stream that contain the alternate streams. There are three basic rules for the alternative sections:

- Within a track, you can use markers to define multiple sections to use additional angles, but each section must have the same number of streams. For example, you cannot have one section early in the track with two alternate streams and a section later in the track with three alternate streams—both sections must have either two or three streams.
- Each alternate angle section can be different lengths, but all streams within a section must be the same length. For example, you can have one mixed-angle section early in the track that is 10 seconds long and a second mixed-angle section that is 20 seconds long. All alternate streams in the first mixed-angle section must be 10 seconds long; all alternate streams in the second mixed-angle section must be 20 seconds long.
- You cannot use still images in the V2 through V9 streams. You can use still images in the V1 stream as long as they are outside of the mixed-angle areas (places where video is present in the V2 through V9 streams).

See Encoding Video for Multi-Angle Tracks for more information on stream requirements.

Creating a Multi-Angle Track

To create a multi-angle track, you need to use two or more suitable video assets that are the exact same length and have the same GOP structure.

To create a multi-angle track

1 Configure the Track Editor so that you can see as many video streams as you intend to use. See Viewing the Streams for details.

2 Add the main video asset to the track's video stream 1 (V1).

3 Add the second video asset to the track's second video stream (V2).

4 Continue adding video assets to the next available streams until they are all in place.

You can name each clip in each stream using the Clip Inspector.

Creating a Mixed-Angle Track

With a mixed-angle track, the main video stream runs the full length of the track with the alternate streams using only a small part of that time. Each of the track's alternate video streams is aligned to a marker, and all corresponding alternate video assets start at the same point.

Each alternate stream must use assets with the same length, and their GOP structures must match the main video stream.

To create a mixed-angle track

1 Configure the Track Editor so that you can see as many video streams as you intend to use. See Viewing the Streams for details.

2 Configure the V1 stream as needed. If you are adding multiple clips or still images, place them all and make any necessary adjustments before adding anything to streams V2 through V9.

3 Create a marker where you want the first mixed-angle portion to begin.

4 Add the second video asset to the track's second video stream (V2) at the marker.

The asset snaps to the marker. Use the timeline zoom control to verify the asset is positioned properly.

5 Continue placing video assets to the next available streams until they are all in place and lined up with the marker.

6 Add a marker at the end of the angle clips by Control-clicking the clip in the V2 stream and choosing Add Marker to Clip End from the shortcut menu.

7 If you are adding an additional mixed-angle section to the track, add another marker and repeat steps 3 through 6.

You can name each clip in each stream using the Clip Inspector.

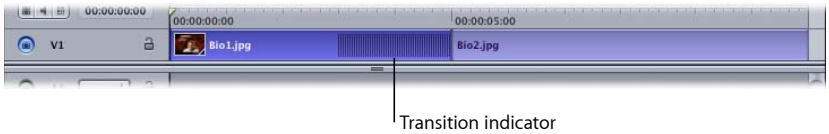
Important: To avoid errors when building your project, do not edit the V1 stream (add, trim, or remove assets) once you have added assets to the V2 through V9 streams.

Using Still Clip Transitions

When you add a still asset as a clip to a track, you are able to configure a transition for it. The transition can be an effect, such as a dissolve or wipe, that provides a smooth transition from the still clip to the next clip.

Each still clip in a track has its own transition settings, accessible in the Transition tab in the Clip Inspector. You can also set a default transition for the track in the Transition tab in the Track Inspector.

The transition is considered part of the still clip, and, in most cases, does not affect its duration. Using long transitions may lead to the still being visible for only a short time, or may require the clip's duration to be increased. If any clips use transitions, the transitions appear as a shaded area in the timeline.



Each transition has a start and end frame. The start frame is the still you are transitioning from and the end frame is the still you are transitioning to. If you are transitioning to a video clip, the end frame is the first frame of the video clip.

Note: You cannot configure a transition from a video clip to a still clip.

Adding Transitions to Still Clips

You can add a transition to any still clip in a track.

Setting a Track's Default Transition

You can set a default transition for a track. All still clips with their type set to Same as Track use the transition.

To set a track's default transition

1. Click in an empty stream in the Track Editor to show the Track Inspector.
2. Click the Transition tab.
3. Choose the transition to use from the Transition pop-up menu.

   Choose "not set" if you do not want still clips to use a default transition. (You can still configure individual clips to use transitions.)
4. Configure the transition using its specific parameters.

Setting an Individual Still Clip's Transition

You can set each still clip's transition settings.

To set a still clip's transition

1. Click the still clip in the timeline to which you want to add the transition.
2. Click the Transition tab in the Clip Inspector.
3. Choose the transition to use from the Transition pop-up menu, or choose Same as Track to use the track's default transition settings.

Choose “not set” if you do not want this still clip to use a transition.

4 Configure the transition using its specific parameters.

Transition Tab in the Track and Clip Inspectors

The Transition tabs in the Track and Clip Inspectors are identical—the only difference is that the Type pop-up menu in the Clip Inspector has a Same as Track choice that the Track Inspector does not have.

- *Start thumbnail:* Shows the video frame that a still transition will start from.
- *Transition thumbnail:* Provides a preview of a still transition when you click the Preview button.
- *End thumbnail:* Shows the video frame that a still transition will end with. This thumbnail is empty in the Track Inspector.
- *Transition:* Choose the type of transition to use. In the Track Inspector, this sets the default transition for this track, which you can override at each still clip.
  - *not set:* Disables default transitions for this track or still clip. (Even with “not set” chosen for the track, you can set transitions at each still clip.)
  - *Still Transition:* Creates a transition clip based on the chosen transition and its related settings.
  - *Same as Track:* Only available in the Clip Inspector. Sets the current still clip to use the transition settings in the Track Inspector.
- *Preview:* Click this to preview the current transition in the Transition thumbnail area.
- *Parameters:* Contains the parameters for the current transition. Each transition has its own set of parameters.

Transition Parameters

Each transition has its own parameters. In many cases, the settings are self-explanatory; however, in some cases, the settings are not obvious. See Transition Parameters for details on the parameters for each transition.

Viewing a Track

The track preview feature allows you to select a video, audio, and subtitle stream to view. You control which streams play using the buttons at the far-left side of the stream.

To preview a track

Do one of the following:

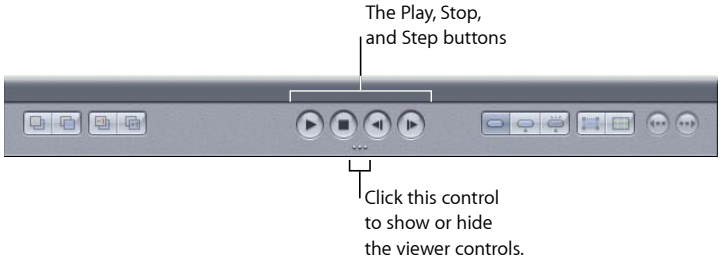
- Control-click in the video stream, then choose Play from the shortcut menu.
- Press the Space bar.
- Move the playhead.

The Viewer tab moves to the front (if not already there) and shows the selected video stream and subtitle. You can also hear the audio of the selected audio stream through your system's speakers or through an external audio decoder and monitor.

You can also see the video if you drag the playhead along the timeline in the Track Editor. If you click in the timeline, the playhead jumps to that position and its video appears in the Viewer tab.

About the Viewer Tab

You use the Viewer tab to preview tracks. It is also used as the Subtitle Editor when you create subtitles in DVD Studio Pro.



When previewing a track, you can use four buttons to control the preview:

- Play/Pause
- Stop
- Step Forward
- Step Reverse

Note: The Subtitle Editor tools in the Viewer tab are unavailable unless you select a subtitle to edit. See Creating Subtitles with DVD Studio Pro for more information.

Pausing or Stopping Playback?

The difference between pausing and stopping playback is what happens to the playhead:

- *When you pause playback by clicking the Play/Pause button:* The playhead remains at its current position.
- *When you stop playback by clicking the Stop button:* The playhead jumps to the position it was at when playback started.

You can also use your keyboard's Space bar to pause or stop the track. The "Space bar toggles between play/pause" setting in the Track pane of DVD Studio Pro Preferences controls whether the Space bar pauses or stops the track:

- *With the checkbox selected:* The Space bar pauses playback, leaving the playhead at its current position.
- *With the checkbox not selected:* The Space bar stops playback, returning the playhead to its original position.

Holding down the Space bar while playing the clip allows you to stop playing the clip automatically by releasing the Space bar. The playhead then follows the above preferences setting.

Modifying the Step Buttons

The Step Forward and Step Reverse buttons move the playhead one frame at a time. You can use modifier keys to enhance their capabilities.

- *Holding down the Shift key while clicking the step buttons:* This moves the playhead one second at a time.
- *Holding down the Option key while clicking the step buttons:* This moves the playhead one Group of Pictures (GOP) at a time.
- *Holding down the Control key while clicking the step buttons:* This moves the playhead one marker at a time.

You can also click a step button and continue to hold down the mouse button to repeatedly step the playhead.

Previewing Angles

If you are previewing a mixed-angle track and select a video stream other than V1, the preview still plays the V1 stream whenever the selected video stream is not present.

To see the multi-angle or mixed-angle stream actually function, you need to use the DVD Studio Pro Simulator.

Simulating a Track

Simulating a track allows you to verify all streams and any special interactivity you may have built into it.

To simulate a track

Do one of the following:

- Select the track, then choose File > Simulate Track, or press Command-Option-0 (zero).
- Control-click the track's name in the Outline tab or its tile in the Graphical tab, then choose Simulate Track from the shortcut menu.
- Control-click one of the streams in the Track Editor, then choose Simulate from Track from the shortcut menu.

These methods force the Simulator to start at this specific track instead of the First Play connection, as it does when you open it using the icon in the toolbar.

Once the track starts playing, you can use the Simulator's controls to choose the streams to view (angle, audio, and subtitle).

See Simulating Your Project for information on using the Simulator.

Creating Slideshows

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Slideshows can be combined with video tracks on a DVD to provide extra information about the subject, such as historical information, newspaper and magazine articles, and cast biographies.

This chapter covers the following:

- Introduction to Slideshows (p. 417)
- Want Your Slideshows to Do More? (p. 418)
- File Formats for Slideshows (p. 418)
- Adding a Slideshow to Your Project (p. 419)
- Creating a Slideshow Using the Menu Editor (p. 420)
- Working with Slides in a Slideshow (p. 421)
- Adding Audio to Your Slideshow (p. 424)
- Working with Slideshows (p. 427)
- Setting Slideshow Properties (p. 437)
- Setting Slide Properties (p. 440)
- Previewing a Slideshow (p. 441)
- Simulating a Slideshow (p. 442)

Introduction to Slideshows

In much the same way you assemble video assets in the Track Editor, you can assemble still images in slideshows, with fixed or user-controlled duration, and with or without audio. With the DVD Studio Pro slideshow feature, you can also create presentations with high-quality audio, and even put photo albums and scrapbooks on DVDs.

Slideshows can be used for training, human resources information, education, corporate communications, health care, weddings, and special events. Features, documentaries, and promotional materials on DVD can include slideshows for supplementary materials.

You can also convert a slideshow to a track, allowing you to add additional audio streams and subtitles to it.

A slideshow can contain up to 99 still images. Each still can have its own display duration, or the viewer can control when to go to the next still. You can add audio to each slide and let each audio file's duration determine the slide's display duration. Alternatively, you can assign one or more audio files to the overall slideshow, with each slide's duration scaled so the whole slideshow fits the duration of the audio files. You can also assign transitions to each slide, adding effects such as dissolves and wipes as you play the slideshow.

Want Your Slideshows to Do More?

Even with all that DVD Studio Pro allows you to do with a slideshow, you may find yourself wanting it to do more. For example, if you want a panning or zooming action on each slide, or more than the 99–still image limit, you will need to use an editing application, such as Final Cut Pro or Final Cut Express to edit the stills together into a QuickTime movie.

You can import the movie into a DVD Studio Pro track. You can even add markers and force manual pauses so that the viewer can still control the pace of the slideshow playback.

Another way to get around the 99–still image limit is to manually create a slideshow in the Track Editor.

File Formats for Slideshows

Slideshows can use a wide variety of still and audio formats. The following sections, Still Images in SD Projects, Still Images in HD Projects, and Audio Files, provide details on these formats.

Still Images in SD Projects

DVD Studio Pro lets you use most common image formats in slideshows. You can also use a mix of formats within a slideshow. See Slideshow File Formats for a list of supported formats.

Once a still is imported into DVD Studio Pro, it is scaled, if necessary, to fit the slideshow's resolution. If any of the still images do not fit the 4:3 or 16:9 aspect ratio you've chosen for the slideshow, a background color fills the gaps. You can set the background color in the General pane in DVD Studio Pro Preferences. See General Preferences for more information.

Important: Use care not to mix 4:3 and 16:9 stills in a slideshow.

For more information about still image sources, see Preparing Slideshow Assets.

Still Images in HD Projects

Creating slideshows for HD projects is not much different from creating slideshows for SD projects. The most common issue is understanding how the HD slideshows handle stills with respect to their resolutions.

A Resolution setting in the General pane of DVD Studio Pro Preferences defines the default resolution of all new slideshows (and tracks and menus) you create. However, the actual resolution of a slideshow is usually defined by the first still you assign to it.

For example, if your default resolution as defined by the preferences setting is 1280 x 720p and you create a new slideshow, its resolution is 1280 x 720p. If the first still you add has a 1920 x 1080 resolution, the slideshow's resolution automatically changes to match it.

If the first still's resolution is something that is non-standard, for example, a still that is 800 x 600, the slideshow's resolution changes to the highest resolution that is smaller than the non-standard size (in this example, full D1, which is 720 x 480 for NTSC or 720 x 576 for PAL), and the image is scaled to fit. If you set a menu's background to something that is smaller than full D1, it is scaled up to the full D1 size.

After you have added one or more stills, you can choose a resolution in the General tab of the Slideshow Inspector to force the stills to be scaled to a specific resolution.

Note: As with SD slideshows, when a still does not match the 4:3 or 16:9 display mode, the empty areas are filled with the slideshow background color, as defined in the General pane of DVD Studio Pro Preferences.

Audio Files

Slideshows can have one or more audio files for the overall slideshow, or a separate file for each still. While you can import files in a wide variety of audio formats for use with slideshows, all audio files within a slideshow must have the same format, resolution, and bit rate. See Preparing Audio Assets for more information about audio files.

Adding a Slideshow to Your Project

You add and manipulate still images in the same manner as you do video assets. You can drag images directly to the Slideshow Editor from the Finder, or you can drag them to the Assets tab, and then to the Slideshow Editor. You can also create slideshows by dragging groups of stills to the Menu Editor.

When you open DVD Studio Pro, no default slideshow is created. You have to add a slideshow to include one in your project.

To add a slideshow to your project

1 Do one of the following:

- Choose Project > Add to Project > Slideshow (or press Command-K).
- Control-click in the Outline or Graphical tab, choose Add from the shortcut menu, then choose Slideshow from the submenu.
- Click Add Slideshow in the toolbar.
- Click the Slideshow tab and drag one or more stills to the Slideshow Editor.

A slideshow element appears in the Outline and Graphical tabs.

2 To open the slideshow in the Slideshow Editor, double-click it.

3 Enter a name for the slideshow in the Slideshow Inspector.

Use the Slideshow Inspector to set the jumps and remote control settings for the slideshow.

Creating a Slideshow Using the Menu Editor

An easy way to create a slideshow and a button that links to it is to drag a group of stills to the Menu Editor and choose Create Button and Slideshow from the Drop Palette.

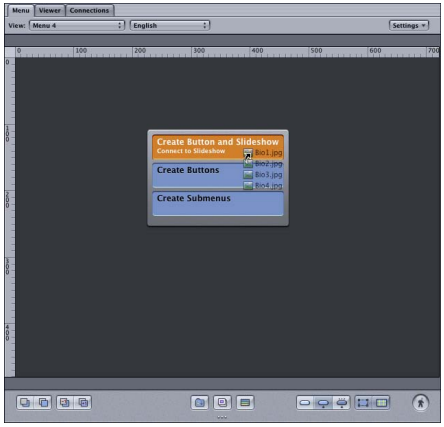
To create a slideshow in the Menu Editor

1 Do one of the following to select the menu to which you want to add the button that links to the new slideshow:

- Choose the menu from the Menu Editor's View pop-up menu.
- Select the menu in the Outline or Graphical tab.

2 In either the Assets tab, the Palette, or a Finder window, select two or more still images to be used in the slideshow. You can also select a folder that contains the still images.

3 Drag the still images to the Menu Editor, positioning them at the location where you want the new button to be created. You can also drag them to an existing button if you want to link that button to the slideshow.



4 When you hold the pointer still, the Drop Palette appears. Choose an option that creates a slideshow.

A slideshow is created and linked to a button on the menu.

You can modify the slideshow just like any other slideshow, adding additional stills and audio as desired. Use the Slideshow Inspector to set the slideshow's name, jumps, and remote control settings.

Working with Slides in a Slideshow

Once you've created a slideshow, you can start adding still images to it. You can add still images one at a time or as a group, and rearrange their order. Before you begin adding slides, you should set their default duration.

Setting the Default Slide Duration

The General pane in DVD Studio Pro Preferences contains a default duration setting that determines each slide's length when first imported. It's a good idea to set the default slide duration before adding slides to the slideshow. While this setting applies to all slides when first imported, you can change the duration of individual slides later.

See General Preferences for more information on this setting.

You shouldn't spend too much time fine-tuning each slide's duration until you have added and arranged all slides, and have added any audio.

Adding Slides to a Slideshow

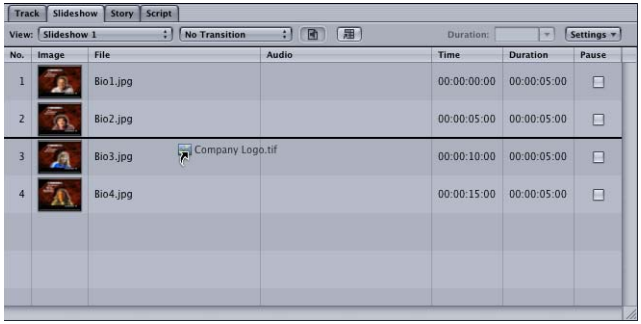
Slides can be added to a slideshow one at a time or as a group.

Note: Do not mix slides with 4:3 and 16:9 aspect ratios in a slideshow. Slideshows only directly support the 4:3 aspect ratio.

To add slides to a slideshow

1 Select one or a group of slides in the Assets tab, the Palette, or a Finder window.

2 Drag the file or files to the Slideshow Editor. If there are existing slides in the editor, a line appears where you position the pointer. The Slideshow Editor inserts the new slides underneath the line. By moving the pointer before releasing the mouse button, you can control where the slides are inserted.



If you add a group of slides, the slides are added in alphabetical order. You can easily rearrange the slide order later.

Selecting Slides in a Slideshow

As you add slides to a slideshow, you will need to be able to scroll through the list and select the slide you want to work on.

To scroll through the slideshow list

Do one of the following:

- Drag the scroller along the right edge of the Slideshow Editor.
- Press the Up Arrow and Down Arrow keys to move through the list one slide at a time.
- Press the Option key, then the Up Arrow or Down Arrow key to jump to the first or last slide in the list.
- Press the Page Up and Page Down keys to move through the list one page at a time.

In the last three cases, a slide is selected and it appears in the Viewer tab.

There are times when you will want to select a group of slides. For example, you might need to delete them, change their duration, or move them to a different point in the list. There are several ways to select groups of slides.

To select a group of slides

Do one of the following:

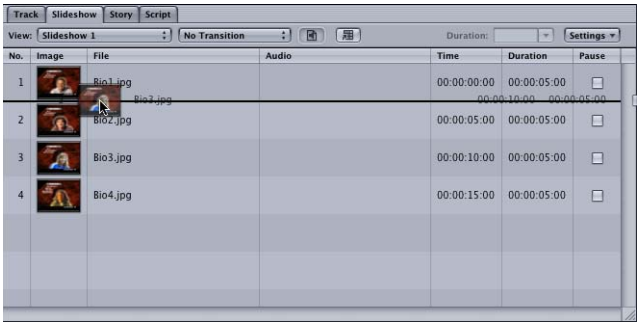
- To select a group of nonadjacent slides, hold down the Command key while you select the slides.
- To select a group of adjacent slides, hold down the Shift key while selecting the first and last slide in the group.
- Hold down the Shift key while pressing the Up Arrow or Down Arrow key to select each slide you scroll through.
- Press Command-A to select all slides. You can also press Command-Shift-A to deselect all slides.

Rearranging Slides in a Slideshow

Use the Slideshow Editor to rearrange slides in a slideshow.

To rearrange slides in a slideshow

1. Select the slide or slides to be moved. You can move a group of nonadjacent slides together, but they will end up adjacent once they are moved.
2. Drag the slide (or slides) to a new position. When you hold a slide over another slide in the list, a line appears where you position the pointer. The repositioned slide is inserted underneath this line when you release the mouse button.



Removing Slides from a Slideshow

You can remove slides from your slideshow, either one at a time or as a group.

To remove slides from a slideshow

1. Select the slide or slides you want to remove in the Slideshow Editor.
2. Do one of the following:
   - Choose Edit > Delete.
   - Press the Delete key.

Note: Dragging a slide out of the list does not remove it from the slideshow.

Adding Audio to Your Slideshow

You can assign one audio file to each slide or add one or more audio files to the overall slideshow. The method you choose depends on the type of slideshow you are creating.

- *If each slide requires descriptive audio:* Having a separate file for each makes it easy to ensure that the audio always matches the appropriate slide. See Assigning an Audio File to Each Slide for more information.
- *If your slideshow consists of stills with an audio file providing background music:* It is much easier to assign one or more audio files, or an "overall audio file," to the entire slideshow. See Assigning Overall Audio Files to the Slideshow for more information.

Assigning an Audio File to Each Slide

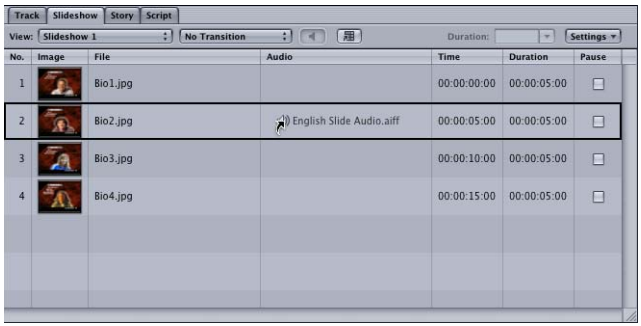
You can assign an audio file to each individual slide in a slideshow. You can use the same audio file multiple times, or only add audio to a few slides and leave the others silent.

Important: You cannot add audio files directly to slides as long as there is an overall audio file assigned to the slideshow. See Assigning Overall Audio Files to the Slideshow for information on removing overall audio files from a slideshow.

To assign audio to a slide using the Slideshow Editor

1 Select the audio file in the Assets tab, the Palette, or a Finder window.

Note: You can only add one audio file at a time when assigning them to slides.



2 Drag the file to a slide in the Slideshow Editor. When you pause the pointer, a black box surrounds the slide the audio will be assigned to.

3 Release the mouse button when the correct slide is selected.

The slide's duration changes to match the length of the audio file. You cannot change the slide's duration to a different value.

4 Press the Space bar to play the slide with its audio. Press the Space bar a second time to stop playback.

To assign audio to a slide using the Slide Inspector

1 Select the slide to which you want to add audio.

2 In the Slide Inspector, choose the audio asset to assign to the slide using the Audio File pop-up menu.

The Audio File pop-up menu in the Slide Inspector only allows you to choose from files already imported into your project.

To change the audio file assigned to a slide
Do one of the following:

- Drag a new file to the slide in the Slideshow Editor.
- Choose a new file with the Audio File pop-up menu in the Slide Inspector.

To delete an audio file assigned to a slide
Do one of the following:

- Select the audio file in the Audio column in the Slideshow Editor, then press the Delete key. Make sure you only select the audio portion of the slide.
- Choose "not set" from the Audio File pop-up menu in the Slide Inspector.

Note: All audio files used within a slideshow must be the same type and use the same resolution and bit rate.

Assigning Overall Audio Files to the Slideshow

You can assign one or more audio files to a slideshow as overall audio files. This allows you to have audio files that are not specific to a single slide. When you assign overall audio to the slideshow, you can choose whether the slide or audio durations determine the slideshow's duration.

To assign overall audio files to a slideshow

1 Select the audio file or files in the Assets tab, the Palette, or a Finder window.

2 Do one of the following:

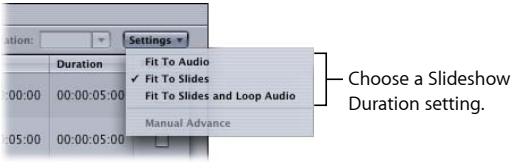
- Drag the file or files to the audio well in the Slideshow Editor.

The audio well shows how many overall audio files are assigned to the slideshow.

- Drag the file or files to the Audio section in the Slideshow Inspector's General tab.

3 Do one of the following to choose one of the two Slideshow Duration options:

- Choose Fit To Audio, Fit To Slides, or Fit To Slides and Loop Audio from the Slideshow Editor's Settings pop-up menu.



- Select either Fit To Slides or Fit To Audio in the Slideshow Inspector's General tab. If you select Fit To Slides, you can also select the Loop Audio checkbox.

Use Fit To Audio to calculate a slide duration value that is applied to all slides, based on the length of the audio file. The duration ensures the slides and the audio finish at the same time and that all slides appear for the same amount of time.

There are several things to be aware of when using Fit To Audio:

- Each slide's duration automatically updates if you add or remove slides or overall audio files in the slideshow.
- Using a short audio file with Fit To Audio can cause the audio to finish before the slides, because the slides cannot be set to durations shorter than their minimum duration (15 frames for NTSC or 12 frames for PAL projects). The minimum duration for the slides increases when one or more of them uses transitions.
- All slide duration controls are disabled when Fit To Audio is selected.

Use Fit To Slides to leave each slide's duration as is. When the slideshow is played, most likely the audio will not finish at the same time that the slides finish appearing.

- *If the slides finish first:* The audio is clipped off. (The Loop Audio setting has no effect.)
- *If the audio finishes first:* The slides continue playing in silence. With Loop Audio selected, the audio loops back to its beginning and continues playing if it reaches its end before the slides.

4 Select the first slide and press the Space bar to play the slideshow with its audio.

Important: Adding an overall audio file automatically removes any audio files assigned to individual slides. As long as there is an overall audio file assigned to the slideshow, you cannot add audio files directly to slides.

To change the assigned audio files using the Slideshow Inspector
Do one of the following:

- Select one or more existing files and press Delete to remove them from the slideshow.
- Drag an existing audio file to a new location in the list to change its order.
- Drag one or more new audio files to the list to add them to the slideshow.

You can also drag additional audio files to the audio well in the Slideshow Editor to add them to the end of the list.

Working with Slideshows

You use the Slideshow Editor and Slideshow Inspector to change the settings for your slideshow.

Setting the Slideshow Editor's Thumbnail Size

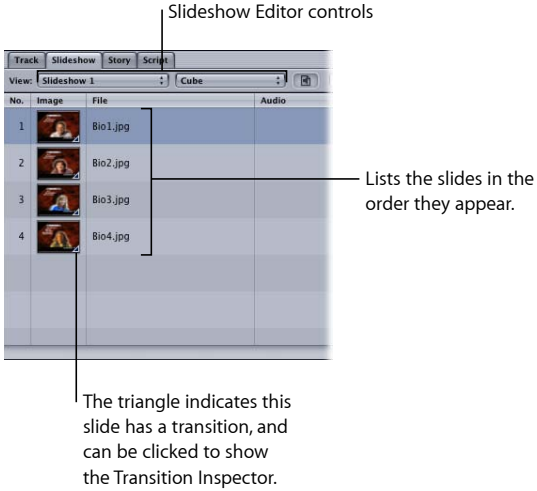
The General pane in DVD Studio Pro Preferences contains a thumbnail image size setting that allows you to control the number of slides displayed in the Slideshow Editor. See General Preferences for more information on this setting.

Slideshow Editor Settings

The Slideshow Editor has two areas:

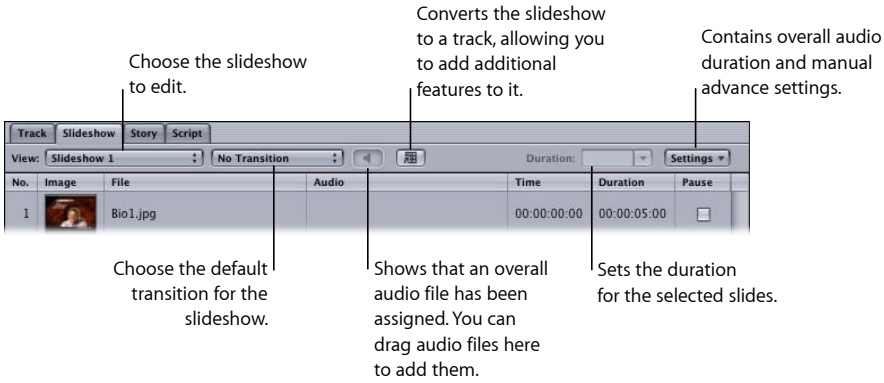
- *The controls along its top:* These buttons and pop-up menus provide easy access to a variety of slideshow features. See Slideshow Editor Controls for details on these.

- *The slide list:* This lists the slideshow's slides in the order they appear. See Slide List for more information.



Slideshow Editor Controls

The top of the Slideshow Editor contains several controls that you can use while making changes to your slideshow.

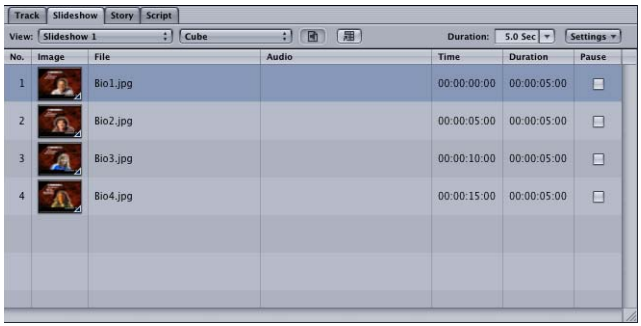


- *View pop-up menu:* Use this to select the slideshow to open in the Slideshow Editor.
- *Transition pop-up menu:* Use this to choose the default transition for the slideshow. See Using Slideshow Transitions for more information.
- *Overall Audio well:* Drag audio files here to add them to the overall audio file list. The graphic in the well changes to show that one or more audio files are currently assigned as the overall slideshow audio. When you position the pointer over the well, a tooltip appears that lists some overall audio file information. You can Control-click the well to remove all assigned overall audio files.

- *Convert to Track button:* Click this button to convert the slideshow to a track. See Converting a Slideshow to a Track for details.
- *Duration:* Enter a new value or choose a value from its pop-up menu. This duration affects all currently selected slides. This setting is disabled if overall audio is being used, and the Fit To Audio mode is selected. See Manually Changing a Slide's Duration for more information.
- *Settings pop-up menu:* Contains a variety of settings you can use with your slideshow:
  - *Fit To Audio, Fit To Slides, and Fit To Slides and Loop Audio:* Control how the slideshow uses the audio when it is configured to use overall audio. These settings are disabled when audio is assigned to individual slides. See Assigning Overall Audio Files to the Slideshow for more information.
  - *Manual Advance:* Use to set all selected slides to pause or, if they are already set to pause, to turn pause off. See Setting Up a Slideshow to Let the Viewer Advance the Slides for more information.

Slide List

The Slideshow Editor displays eight columns of information for each slide. You can edit two of these columns: Duration and Pause.



Note: You can drag the list headings to rearrange their order. You can also drag the edges of the Audio columns to control its width.

- *No.:* Displays each slide's number, indicating its order in the slideshow. You cannot edit this number directly, but if you drag one or a group of slides to a new position, the number is changed to reflect the slide's new position in the slideshow.
- *Image:* Displays a thumbnail image of each slide. All slides with a transition assigned have a triangle in their lower-right corner. Press Command–Equal Sign (=) for large thumbnails and Command-Hyphen (-) for small thumbnails.
- *File:* Displays the name of each slide's asset file.
- *Audio:* Displays the name of the audio file assigned to the slide (if applicable).

- *Time:* Displays the slideshow's elapsed time at the beginning of each slide. This time value does not include the duration of the slide it is listed with. All slideshows start at 00:00:00:00. While you cannot directly edit this value, changing the duration of any slides positioned earlier in the list will change this time value.
- *Duration:* Displays the slide duration. This value is either the default duration selected in the Preferences window, the length of the audio file assigned to the slide, or, when using an overall audio file with the "Fit to audio" option selected in the Slideshow Duration pop-up menu, a value calculated so that all slides play for an equal amount of time and match the overall audio file length. You can edit this duration except on slides that have an audio asset assigned to them or in slideshows with an overall audio file that have "Fit to audio" selected. See Manually Changing a Slide's Duration for details.
- *Pause:* Select the checkbox if you want a pause to occur at the end of the slide. The viewer then manually advances to the next slide using the Next button or Play button on the DVD player's remote control.

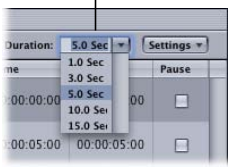
  Note: If the slide contains a transition, the pause occurs before the transition. When the viewer advances to the next slide, the transition plays and then the next slide appears.

Manually Changing a Slide's Duration

You can manually change each slide's duration except on slides that have an audio asset assigned to them or in slideshows with an overall audio file that have "Fit to audio" selected.

To change a selected slide's duration to a fixed value using the Slideshow Editor

1. Select one or more slides to change their durations.
2. Do one of the following:
   - Choose a set value (1, 3, 5, 10, or 15 seconds) from the Duration pop-up menu.
   - Enter a value (in seconds) in the Duration field and press Return.



The duration of all selected slides is changed to the new value.

To manually enter a slide's duration in the slide list in the Slideshow Editor

1 Select the slide whose duration you want to change.

2 Double-click the current duration setting.

The duration highlights.

3 Type the new value and press Return.

Once you press Return, the new duration is set and the Time values for all affected slides adjust to reflect this change. The Duration value of the next slide is automatically selected. If you do not want to change its duration, select a different slide.

When entering a value, you don't need to enter a colon to define the number pairs—the values automatically divide into pairs starting from the frames.

If you enter a value that is greater than the maximum value for that field, the appropriate time is added to the next field. For example, if you enter 79 seconds, the seconds field displays "19" and one minute is added to the minutes field.

Note: The minimum slide duration for NTSC projects is 15 frames; for PAL, it is 12 frames. The minimum is longer on slides using transitions.

To manually enter a slide's duration in the Slide Inspector

1 Select the slide whose duration you want to change.

2 Do one of the following:

- Enter a new duration directly. Use the same methods as when entering a new duration in the slide list area of the Slideshow Editor.
- Choose a duration from the Duration pop-up menu.

Setting Up a Slideshow to Let the Viewer Advance the Slides

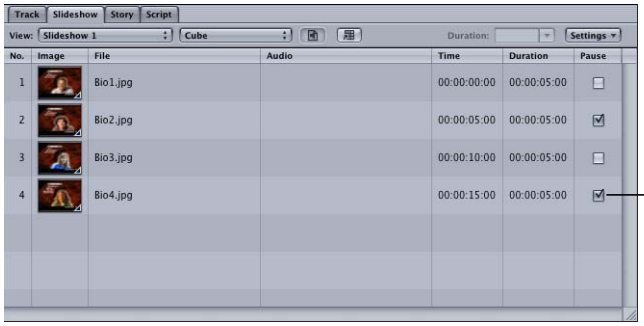
You can set up your slideshow so that each slide appears for a specified length of time or until the viewer decides to advance to the next slide. For example, you might want to coordinate your slideshow for a speaker to step through each slide. This allows the viewer (in this case the speaker) to choose when to advance to the next slide by pressing the Next or Play button on the DVD player's remote control.

To set up a viewer-advanced slideshow

Do one of the following:

- Select the checkbox in the Pause column next to each slide that you want the viewer to be able to advance manually.
- Select a group of slides and choose Manual Advance from the Slideshow Editor's Settings pop-up menu. This turns on the Pause option on all selected slides.

- Select a slide and select the Manual Advance checkbox in the Slide Inspector.



The pause occurs at the end of the slide's duration. If you have added an audio asset to the slide, the audio plays and then the pause occurs. The viewer can press the Next button or the Play button on the DVD player's remote control to continue to the next slide.

Note: If the slide contains a transition, the pause occurs before the transition. When the viewer advances to the next slide using the Play button, the transition plays and then the next slide appears. If the viewer advances using the Next button, the transition does not play, and the next slide immediately appears.

Setting a Pause on the Last Slide

The viewer may have problems when playing your slideshow on some DVD players if you set the last slide to have a pause. Some DVD players do not react to presses of the Next button once the viewer reaches the last slide, which leaves the viewer with no way to activate the slideshow's End Jump setting.

There are two methods you can use to avoid this problem and provide consistent playback on all DVD players:

- Set the slideshow's Next Jump connection in the Connections tab.
- Duplicate the last slide in the slideshow and set the new last slide not to pause.

Setting the Slideshow's Next Jump Connection

Each element in your project has a Next Jump connection that is normally left not set. The only place you can set a connection for Next Jump is in the Connections tab.

To set the slideshow's Next Jump connection

1. Select the slideshow in the Outline tab.
2. Click the Connections tab.
3. Choose Advanced from the Connection tab's View pop-up menu. Make sure the pop-up menu next to the View pop-up menu is set to All.
4. Locate the End Jump and Next Jump items in the list of sources.

5 Set the Next Jump target to be the same as the slideshow's End Jump setting by dragging the End Jump target setting to the Next Jump target.

See Next Jump and Prev Jump for more information.

Duplicating the Last Slide

Duplicating the last slide in a slideshow allows you to create a "false ending" for the slideshow, and avoid the pause issue.

To duplicate and configure the last slide in a slideshow

1 In the Slideshow Editor, determine the asset name of the last slide and drag that slide's asset from the Assets tab to the next slide location.

2 Select the new last slide in the Slideshow Editor and set its duration to 15 frames by double-clicking its duration value, entering 15, then pressing Return.

Note: For PAL projects, you can use a 12 frame duration.

3 Make sure the last slide's Pause checkbox is not selected.

When you play this version of the slideshow and press the Next button on the last slide with a pause, it jumps to the new last slide and then to the End Jump setting.

Using Slideshow Transitions

Slideshow transitions allow you to control whether the slideshow directly jumps from slide to slide or uses a transition effect, such as a wipe or crossfade, to move from slide to slide. You are able to set a transition effect that applies to all slides in the slideshow or you can individually configure each slide's transition effect.

About Transitions

Each slide has its own transition settings, accessible in the Transition tab in the Slide Inspector. The default transition settings for the slideshow are in the Transition tab in the Slideshow Inspector.

The transition is considered part of the slide, and, in most cases, does not affect its duration. Using long transitions may lead to the slide being visible for only a short time, or may require the slide's duration to be increased. When you select a transition for a slide, group of slides, or the slideshow, a warning appears if any slides must be lengthened.

Start and End Frames

Each transition has a start and end frame. The start frame is the slide you are transitioning from, and the end is the slide you are transitioning to.

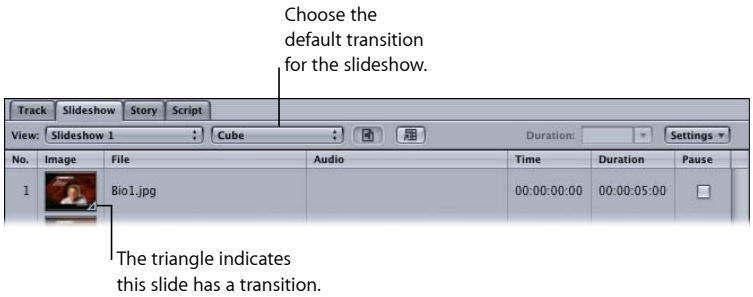
If the last slide in a slideshow has a transition assigned, its transition's end frame is based on the slideshow's End Jump setting. If the End Jump is set to a script, the transition is to black.

Setting a Slideshow's Default Transition

Setting the transition for a slideshow affects all slides with their type set to "Same as Slideshow."

To set a slideshow's default transition using the Slideshow Editor

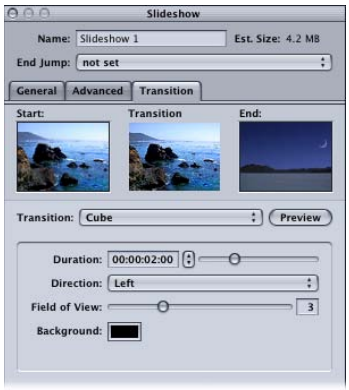
- Choose the transition from the Slideshow Editor's Transition pop-up menu.



The transition uses its default settings. You can change the settings in the Transition tab in the Slideshow Inspector.

To set a slideshow's default transition using the Slideshow Inspector

1. Double-click an empty place in the Slideshow Editor's control area to show the Slideshow Inspector.
2. Click the Transition tab.



3. Choose the transition to use from the Transition pop-up menu.

   Choose "not set" if you do not want slides to use a default transition. (You can still configure individual slides to use transitions.)

4. Configure the transition using its specific parameters.

Setting an Individual Slide's Transition

You can use either the Slide Inspector or the Slideshow Editor to set the transition for a slide.

To set a slide's transition in the Slide Inspector

1 Select the slide for which you want to set a transition.

2 Click the Transition tab in the Slide Inspector and set the transition parameters.

In addition to selecting one of the transitions to use, you can choose "not set" to disable transitions for that slide, or "Same as Slideshow" to have the slide use the slideshow's default transition.

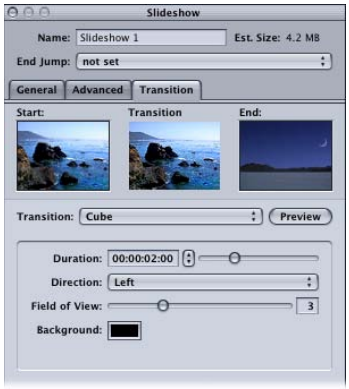
To select a transition for a group of slides

1 Select the group of slides for which you want to select a transition.

2 Control-click one of the slides, choose Transition from the shortcut menu, then choose the transition from the submenu.

Setting the Transition Parameters

The Transition tabs in the Slideshow and Slide Inspectors are identical—the only difference is that the Type pop-up menu in the Slide Inspector has a "Same as Slideshow" choice that the Slideshow Inspector does not have.



- *Start thumbnail:* Shows the video frame that a still transition will start from.
- *Transition thumbnail:* Provides a preview of a still transition when you click the Preview button.
- *End thumbnail:* Shows the video frame that a still transition will end with. This thumbnail is empty in the Slideshow Inspector.
- *Transition:* Choose the type of transition to use. In the Slideshow Inspector, this sets the default transition for this slideshow, which you can override at each slide.
  - *not set:* Disables transitions for this slideshow or slide. (Even with "not set" chosen for the slideshow, you can set transitions at each slide.)

- *Still Transition:* Creates a transition clip based on the chosen transition and its related settings.
- *Same as Slideshow:* Only available in the Slide Inspector. Sets the current slide to use the transition settings in the Slideshow Inspector.

- *Preview:* Click this to preview the current transition in the Transition thumbnail area.
- *Parameters:* Contains the parameters for the current transition. Each transition has its own set of parameters.

Transition Parameters

Each transition has its own parameters. In many cases, the settings are self-explanatory; however, in some cases the settings are not obvious. See Transition Parameters for details on the parameters for each transition.

Converting a Slideshow to a Track

You may want to add several features to your slideshow that the Slideshow Editor does not support. These include:

- Subtitles
- Alternate language streams
- The ability to combine moving video with the slides

To get access to these features, you can convert your slideshow to a track. Once converted to a track, what was previously a slideshow is now a track, and must be edited in the Track Editor.

Note: Once you convert a slideshow to a track, you cannot convert it back. You can use the Undo feature or create a duplicate of the slideshow before you convert it to a track. If you do create a duplicate of the slideshow, be sure to delete the duplicate before you build your project.

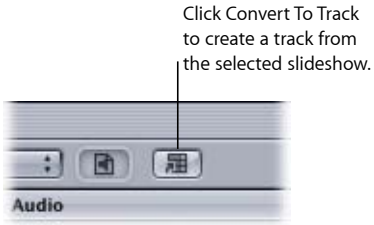
To convert a slideshow to a track

1. In the Outline tab, Control-click the slideshow's name, then choose Duplicate from the shortcut menu.

   An identical copy of the slideshow is created in case you need it later. You should delete this copy when you are sure that it is no longer needed.

2. Choose the original slideshow in the Slideshow Editor.
3. Do one of the following:
   - Choose Project > Slideshow > Convert to Track.
   - Click Convert To Track in the Slideshow Editor.

The slideshow is deleted and a new track is created using the slideshow's name.



The new track has a marker at each slide, each named with the slide's filename. Each slide retains its duration and pause setting. If audio files were assigned, they are also present in the track.

Note: If a slide has a transition, a cell marker is placed at the beginning of the transition. If the slide has pause selected, this marker is set to pause.

Setting Slideshow Properties

Selecting a slideshow in the Outline tab displays the Slideshow Inspector. The Slideshow Inspector contains a top section and three tabs: General, Advanced, and Transition.

Settings at the Top of the Slideshow Inspector

Following are the settings at the top of the Slideshow Inspector.

- *Name:* Enter the name of the slideshow. This is the name that appears in the Outline tab (where you can also change it).
- *Est. Size:* Displays the amount of disc space the slideshow requires.
- *End Jump:* Choose a setting from this pop-up menu to determine what happens once the slideshow finishes playing.

General Tab in the Slideshow Inspector

The settings in the General tab in the Slideshow Inspector are used to set the slideshow's resolution and display mode. These settings are also used to configure a slideshow for overall audio and are disabled when you are using no audio or are assigning audio to individual slides.

Resolution and Display Settings

These settings define the basic video attributes of the slideshow.

- *Resolution:* Choose the slideshow's resolution.
  - *For SD DVD projects:* The resolution is either 720 x 480i (NTSC) or 720 x 576i (PAL).
  - *For HD DVD projects:* You can choose from any of the supported resolutions. The resolution automatically changes to match the first slide's resolution if it matches one of the supported resolutions, or to the closest smaller resolution if there is not a direct match. DVD Studio Pro Preferences includes a setting for the default resolution (which also applies to menus and tracks). See Still Images in HD Projects for more information.
- *Display Mode:* Set the aspect ratio for this slideshow (4:3 or 16:9) and, with 16:9, choose how it displays on a 4:3 monitor. The aspect ratio of the slide assets should match this setting.

Parameters

These settings define the length of the slideshow.

- *Slideshow Duration:* Controls how the slideshow uses the audio when it is configured to use overall audio. These settings are disabled when you assign audio to individual slides. See Assigning Overall Audio Files to the Slideshow for more information.
  - *Fit To Audio:* Slide durations are changed to a value that ensures the slides and audio end at the same time.

- *Fit To Slides:* Slide durations are not changed, which means the audio can end before or after the last slide. Selecting Fit To Slides enables the Loop Audio checkbox.
- *Loop Audio:* Select this to have the slide durations control when the slideshow ends. If the audio is too long, it is clipped so that it ends with the last slide. If the audio is too short, it loops back to the first audio asset and continues playing until the last slide finishes.

- *Total Running Time:* Shows the duration of the slideshow.

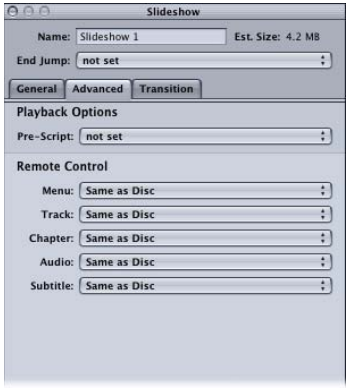
Audio

The audio section lists the overall audio files assigned to the slideshow. You can drag a file within the list to change its order.

- *Add (+):* Opens a file selection dialog so you can add an audio file to the list.
- *Delete (–):* Removes the selected audio files from the list.
- *Total Audio Duration:* Shows the combined duration of the audio files.

Advanced Tab in the Slideshow Inspector

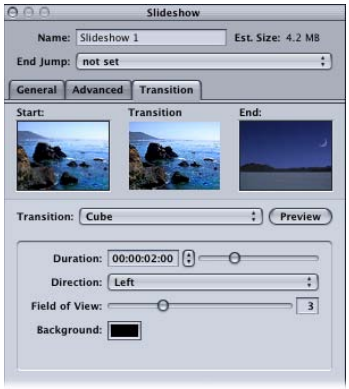
Following are the settings in the Advanced tab of the Slideshow Inspector.



- *Pre-Script:* If applicable, you can choose a script from this pop-up menu. See Pre-Scripts for information on using pre-scripts.
- *Remote Control:* Use these pop-up menus to customize the viewer's interaction with the title from this slideshow. See Remote Control Settings for details.

Transition Tab in the Slideshow Inspector

See Setting the Transition Parameters for details on the Transition tab.



Setting Slide Properties

If you select a slide in the Slideshow Editor, the Slide Inspector appears. It allows you to set attributes for each slide. It contains a top section and two tabs: General and Transition.

See Setting the Transition Parameters for details on the Transition tab.

Note: Any settings you make in the Slide Inspector become marker properties if you convert the slideshow to a track.

Settings at the Top of the Slide Inspector

Following are the settings at the top of the Slide Inspector.

- *Name:* Displays the name of the slide as it appears in the Assets tab, where its name can be changed.
- *Asset:* Displays the name of the slide's actual asset.

General Tab in the Slide Inspector

Following are the settings in the General tab of the Slide Inspector.

- *Slide Duration:* Displays the duration of the selected slide. You can enter a new duration or choose a duration from the pop-up menu.
- *Manual Advance:* Determines whether the slideshow pauses (checkbox selected) or continues playing to the next slide (checkbox not selected).
- *Audio File:* Displays the name of the audio asset assigned to this slide. You can use this pop-up menu to choose from the audio assets already imported into this project.

  Important: All audio files within a slideshow must have the same format, resolution, and bit rate.
- *DVD@CCESS:* Select this checkbox for titles played on a computer if you need to open an application such as a web browser to view special content when the slide starts playing. See DVD@CCESS for information on DVD@CCESS.

Previewing a Slideshow

Before you build the slideshow, it's a good idea to preview it.

To preview a slideshow

1. Select the slideshow in the Outline tab.
2. In the Slideshow Editor, select the slide to start playing from.
3. Do one of the following:
   - Press the Space bar.
   - In the Slideshow tab, Control-click a slide, then choose Play from the shortcut menu.

The Viewer tab appears and the slideshow starts playing from the selected slide. If the slideshow has audio assigned, it also plays. A drawback is that pauses are ignored. You can use the Simulator to play the slideshow and test any pauses you have set.

Simulating a Slideshow

Simulating a slideshow allows you to fully test a slideshow, including its pauses and DVD@CCESS settings.

To simulate a slideshow

Do one of the following:

- Select the slideshow, then choose File > Simulate Slideshow, or press Command-Option-0 (zero).
- Control-click the slideshow in the Outline tab, then choose Simulate from the shortcut menu.
- In the Slideshow tab, Control-click a slide, then choose Simulate from the shortcut menu.

These options force the Simulator to start at this slideshow instead of the First Play connection, as it does when started by clicking Simulator in the toolbar.

Once the slideshow starts playing, you can use the Simulator's controls to test the pauses.

See Simulating Your Project for information on using the Simulator.

Creating Subtitles

19

Although the most common use for subtitles is to display a text version of the dialogue, subtitles created in DVD Studio Pro can be used for many other purposes.

This chapter covers the following:

- Introduction to Subtitles (p. 443)
- Importing Older DVD Studio Pro Subtitles (p. 445)
- Subtitles and Overlays (p. 445)
- About Subtitles and Closed Captions (p. 445)
- Subtitle Stream Basics (p. 446)
- Subtitle Inspector (p. 448)
- What Happens with Different Aspect Ratios? (p. 454)
- Viewing Subtitles (p. 455)
- Creating Subtitles with DVD Studio Pro (p. 457)
- Importing Graphics Files for Subtitles (p. 463)
- Creating and Importing Subtitle Files (p. 464)
- Importing a Subtitle File (p. 465)
- Creating an STL Format Subtitle File (p. 467)
- Creating Buttons over Video (p. 471)
- Configuring a Button over Video Subtitle Clip (p. 473)

Introduction to Subtitles

Each track can include up to 32 subtitle streams. Having multiple streams makes it possible to offer text in several languages, allowing the viewer to select the appropriate one.

Increasingly, subtitles are being used for other purposes, such as to create buttons over video (also known as *interactive markers* or *interactive subtitles*), which allow the viewer to make choices while watching the movie. You can also use subtitles to supply simple graphics to augment the video, such as arrows and lines.

You can create text subtitles directly in DVD Studio Pro, one at a time. You set their position, font, size, style, and color, and can have them fade in and out. You control their start and stop time either by entering timecode values or dragging in the timeline.

You can also import subtitle files containing all of the subtitles for a track. DVD Studio Pro supports files that conform to any of these formats:

- *STL:* The Spruce Technologies subtitle format
- *SON:* The Sonic Solutions bitmap-based format
- *TXT:* A plain text file
- *SCR:* The Daiken-Comtec Laboratories Scenarist bitmap-based format

Note: See Importing Older DVD Studio Pro Subtitles for information on importing SPU format subtitles (subtitles created with earlier versions of DVD Studio Pro).

Files in these formats should all contain multiple subtitle text or graphics images tied to timecode values, ensuring they are placed properly within the timeline.

You can also import graphics files and use them as subtitles or overlay them on the video. For example, you could have a graphic that traces a route on a map that appears in the video stream. By importing several graphics, you could effectively animate the graphic (by making the line move in the map, for example).

Subtitles can also be used to superimpose buttons over the track's video. The viewer selects these buttons just as they would buttons on a menu. Creating buttons over video is similar to creating buttons using the standard menu creation method; that is, both involve overlays, drawing rectangles to identify each button's active area, and color mapping.

There are no limits to how many subtitles you can add to a subtitle stream. However, there are limits to how many subtitles you can have that provide buttons over video. See How Do Buttons over Video Work? for more information.

There is also no limit to the length of subtitles—you can make subtitles as short as one frame or as long as the track.

Short subtitles can be useful if you want to create an animation effect, with simple graphics that move. See Using Graphics Files to Create an Animation for more information.

Subtitles can be configured so that the viewer controls whether they appear, or they can be forced to appear.

Importing Older DVD Studio Pro Subtitles

Because of the way they are created, you cannot directly import subtitle files created with the Subtitle Editor in earlier versions of DVD Studio Pro. These subtitle files have an ".SPU" extension.

However, you can import older DVD Studio Pro projects that contain subtitles into DVD Studio Pro 4. Each subtitle entry is converted to a TIFF file and placed on the timeline at the correct location. Because the subtitles are TIFF files, you cannot edit their text within DVD Studio Pro 4.

Subtitles and Overlays

All subtitle types use the same advanced overlay method used in the standard menu creation method. This means that any graphics and subtitle files must be made of up to four predefined colors, on which you map the actual colors that appear when the title plays. See Creating Overlays for information on overlay graphics.

About Subtitles and Closed Captions

While this chapter describes working with subtitles, it is important to understand how they compare to closed captions, which are also supported by DVD Studio Pro when creating NTSC SD projects. This is especially important if you are creating DVD titles that must comply with accessibility requirements.

There are two methods available to you to provide visual text to the viewers of your NTSC SD-based DVD title: adding subtitles and importing closed caption files. In both cases, text can be made to appear on the screen along with the video. However, the capabilities of each method are different.

Note: DVD Studio Pro does not support closed captions in HD projects or PAL SD projects.

Subtitle Capabilities

Subtitles generally provide dialogue text only—there is no text description of sounds that may also be part of a scene (although those could be added if you wish). Subtitles are generally intended to provide the dialogue in a second language and assume you can hear the disc's audio.

When creating subtitles, you can define their position, size, font, and color. Subtitles do not actually have to be text—they can be a graphic used to display a logo or point out an item in the video.

All DVD players, including those used by computers, include the ability to show subtitles. Subtitles work the same in both NTSC and PAL projects.

Closed Caption Capabilities

Closed captions provide not only dialogue text but also descriptions of other sounds that are part of a scene (such as a phone ringing or a dog barking). They are intended to enhance the viewing experience for deaf and hearing-impaired viewers.

To view closed captions, you must have a suitable decoder—either built in to the television or as a standalone device. When creating closed captions, you choose the text's position and, in some cases, its color—the font is controlled by the decoder.

Because a lot of computers do not have closed caption decoders, playing DVD titles on them means you generally cannot count on being able to show any included closed captions.

Due to their reliance on information contained in line 21 of the video signal, closed captions, as supported by the DVD specification, apply to NTSC programs only.

See Adding Closed Captions to a DVD for details on importing a closed caption file.

Subtitle Stream Basics

There are several aspects of working with subtitle streams that apply whether you create them in DVD Studio Pro or import them.

Working with Subtitles in DVD Studio Pro

Working with subtitles in DVD Studio Pro involves using the Track Editor, the Subtitle Inspector, and the Viewer tab.

All subtitles, whether created with text entered in DVD Studio Pro, as individual imported graphics files, or as a subtitle file containing multiple subtitles, are based on subtitle clips in one of the 32 subtitle streams. In general, you work with the subtitle clips the same way you work with audio clips in the Track Editor. You can drag the clips to change their position and drag their edges to change their length.

The Subtitle Inspector provides the settings you use to configure each of the subtitle clips. Even the subtitle clips you import as part of a subtitle file can have their settings modified in the Subtitle Inspector.

The Viewer tab serves the Subtitle Editor function. When you double-click a subtitle clip in the Track Editor, its playhead jumps to the subtitle clip's start, with the subtitle appearing over the track's video. You can enter and position subtitle text directly in the Viewer tab. It also contains the tools you use when you create subtitles configured for buttons over video.

How Subtitles Switch Streams

When the viewer switches from one subtitle stream to the other, two things must happen before the second stream's subtitles appear:

- The subtitle clip currently showing must reach its end. No subtitle actions, including switching streams and turning subtitles off, can occur until the DVD player finishes showing the current subtitle clip.
- A clip on the second stream must start. If a subtitle clip on the second stream starts before the subtitle clip on the first stream ends, it does not appear, and instead, the next clip on the second stream is the first from that stream to appear.

For most standard subtitles, this happens relatively quickly and the viewer quickly starts seeing subtitles from the selected stream. At most they might miss one subtitle clip.

These rules become important if you create a long subtitle clip that is the same length as the track because you will never be able to select it or switch from it. Having a single long subtitle clip is useful if you want to place a logo in a corner of the image. For this to work, its subtitle stream must be selected before the long clip starts, and once selected, you cannot switch it off or switch to a different subtitle stream.

Note: Subtitles that cross chapter markers are automatically split into multiple subtitle clips at each marker when you build your project.

Subtitle Preferences

DVD Studio Pro contains a set of preferences that control many aspects of how subtitles appear on a stream, whether manually created or imported (unless specifically overridden). It is recommended that you take some time and configure these preferences before you start working in the subtitle streams.

The preferences cover the following areas:

- *Fade and length:* The General pane in DVD Studio Pro Preferences contains the default settings for the fade in and out settings as well as the subtitle length. The fade settings apply to all subtitles except those configured to provide buttons over video. The length setting applies only to new subtitles you create in DVD Studio Pro.
- *Font and position:* The Text pane in DVD Studio Pro Preferences contains the default settings for the font used with text subtitles and the position settings for both text and graphic-based subtitles. Depending on the type of subtitle file you are importing, these settings may be overridden during the file import.
- *Color mapping:* The Colors pane in DVD Studio Pro Preferences contains default settings for the color mapping used when importing subtitle files and creating subtitles in DVD Studio Pro. Depending on the type of subtitle file you are importing, these settings may be overridden during the file import.

See Setting DVD Studio Pro Preferences for more information.

Applying Subtitle Settings to the Stream

No matter how carefully you configure your preferences and how much time you spend deciding how the subtitles should look, there will often be times when you need to make a change to all subtitle clips in a stream (and there could be hundreds of clips in a stream). For example, you may need to use a different color for the text or to change the font.

The Subtitle Inspector includes an Apply to Stream function that you can use to selectively apply changes you make in one subtitle clip to all subtitle clips in that stream.

There are three areas in which you can independently apply changes you make to the entire stream:

- *Fade In and Out:* You can make changes to a clip's fade settings in the General tab in the Subtitle Inspector and apply the changes to all subtitle clips in the stream.
- *Text formatting:* You can make changes to a clip's font and position settings in the General tab in the Subtitle Inspector and apply the changes to all subtitle clips in the stream.
- *Color mapping:* You can make changes to a clip's color and opacity settings in the Colors tab in the Subtitle Inspector and apply the changes to all subtitle clips in the stream.

Subtitle Inspector

The Subtitle Inspector contains settings applicable to all subtitle clips. It shows the settings of the currently selected subtitle clip. The Subtitle Inspector contains three tabs: General, Button, and Colors. There is also the Text entry area at the top of the Inspector.

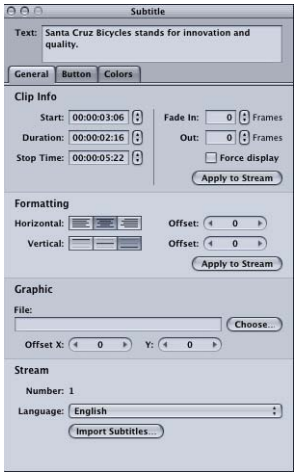
Text Entry Area in the Subtitle Inspector

You can use the Text area to enter subtitle text for the current subtitle clip. The Text area also displays any text you enter directly in the Subtitle Editor. If you have imported the subtitle as a graphic, the Text area does not show any text contained in the graphic.

Click within the Text area to enter text. You can even combine text with an imported graphic. Press Return to insert a line break.

General Tab in the Subtitle Inspector

Following are the settings in the General tab of the Subtitle Inspector.



Clip Info

- *Start:* The timecode where this clip appears. You can change a clip's start time by entering a new value here or by dragging the clip's leading edge in the Track Editor. Changing the start time also affects the clip's end time, but not its duration.
- *Duration:* The length of the clip. If you enter a new duration here, the clip's end time changes to fit it. You can also change a clip's duration by dragging its edges in the Track Editor.
- *Stop Time:* The timecode where the clip stops appearing. You can change a clip's stop time by entering a new value here or by dragging the clip's trailing edge in the Track Editor. Changing the stop time also affects the clip's duration.
- *Fade In:* You can enter a value (in frames) that controls how long the clip takes to dissolve on. The fade in starts at the clip's start time.

  Note: The Fade settings are unavailable when you are working with a subtitle clip configured to provide buttons over video.
- *Out:* You can enter a value (in frames) that controls how long the clip takes to dissolve off. The fade out finishes at the clip's stop time.

  Note: Because there are only 16 opacity levels, setting fades longer than 20 frames produces noticeable "stepping" as the subtitle dissolves in and out.
- *Force display:* Select this checkbox to force specific subtitle clips to appear, even if the viewer has disabled subtitles. Subtitle clips set to force their display only appear if their subtitle stream is currently selected.
- *Apply to Stream:* Click to apply the fade in and out settings to all subtitle clips in this stream.

Formatting

- *Horizontal:* Sets the horizontal justification of the text. Click the appropriate icon for left, center, or right alignment.
- *Horizontal Offset:* Trims the horizontal position of the text, in pixel steps, from the selected justification setting. Positive values move the text to the right and negative values move it to the left. A value of 0 positions the text at its justification setting.
- *Vertical:* Sets the vertical justification of the text. Click the appropriate icon for top, center, or bottom alignment.
- *Vertical Offset:* Trims the vertical position of the text, in pixel steps, from the selected justification setting. Positive values move the text down and negative values move it up. A value of 0 positions the text at its justification setting.
- *Apply to Stream:* Click to apply the formatting settings to all subtitle clips in this stream.

Graphic

- *File:* Shows the name of the graphics file assigned to this subtitle clip. You can enter the path and name for a graphics file or click the Choose button to open a file selection dialog.
- *Offset X and Y:* Use to trim the graphic's position.
  - *Offset X:* Trims the horizontal position. Positive values move the graphic to the right and negative values move it to the left. A value of 0 positions the graphic at its default position.
  - *Offset Y:* Trims the vertical position. Positive values move the graphic down and negative values move it up. A value of 0 positions the graphic at its default position.

Stream

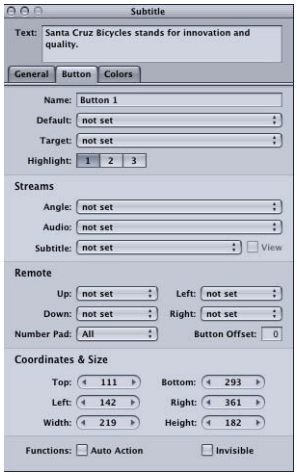
- *Language:* Choose the stream's language. This setting applies to all subtitles in the stream. You can also choose the stream's language in the stream configuration area of the Track Editor.
- *Import Subtitles:* Click this button to import a subtitle file. This file affects the entire subtitle stream. See Importing a Subtitle File for more information.

  Note: Importing a subtitle file deletes any existing subtitle clips from the stream.

Button Tab in the Subtitle Inspector

The Button tab in the Subtitle Inspector is empty unless the subtitle is configured to provide buttons over video. See Creating Buttons over Video for more information.

You use the Button tab to configure the buttons to add to the subtitle.



- *Name:* By default, buttons are named "Button _," where "_" is the button number in that menu. To reduce confusion when viewing a list of the menu's buttons, it is helpful to rename the buttons based on their functions.
- *Default:* Choose the button to be selected when the subtitle appears during playback of the title. This setting can be overridden by any element that jumps to this subtitle's marker, based on its jump setting.
- *Target:* You can use this pop-up menu to define a button's action when activated. (You can also use the Connections tab or Control-click the button.) Often you must set the connection later because what you want to jump to has not been added to the project yet. The pop-up menu contains all possible elements you can jump to.
- *Highlight:* Select the color mapping set (1, 2, or 3) to use for this button.
- *Angle/Audio/Subtitle Streams:* Use these three pop-up menus to have a button select specific angle, audio, and subtitle streams to play back. For the subtitle stream, you can also choose whether subtitles should appear. These settings are only active if the target is set to "not set." You can set the target to run a script if you want a button to jump to a specific stream in a different track.
- *Remote:* This area lets you set the actions that take place when the viewer uses the arrow buttons on the DVD player's remote control to navigate through the title. Because this is the typical way the title will be viewed, it is important to spend some time configuring the navigation in a logical, predictable way. See Configuring Button Navigation for information.

- *Number Pad:* Defines which buttons are directly accessible by a DVD player's numeric keypad. Choose All, None, or a button number from the pop-up menu. When you choose a button number, that button and all buttons less than that number are accessible via the numeric keypad—buttons greater than this value are blocked from direct access.

  Important: This feature is based on the order in which the buttons are created. In most cases, this order is the same as the default button names shown in the Viewer. This button order can be changed if you delete a button and later add a new button—the new button's default name is not a reliable indicator of the order in which the buttons were created.

- *Button Offset:* You can use this to offset button numbers so they make sense to a viewer who wants to select a button by entering its number. For example, you may have a set of scene selection menus with numbered scenes. One of the menus may have scenes 23 to 34, with the button for scene 23 being the first button on the menu. If you enter an offset value of 22 for this menu, when the viewer enters 23 on the remote control, 22 is subtracted from it, with the result being 1—the button's actual number.

- *Coordinates & Size:* This area lets you set the location of each edge of the button's active area, plus the area's height and width. The upper-left corner of the menu is at pixel 0, line 0. You can enter values for each edge, allowing you to precisely position and size the button's active area. (You can also drag the area and each of its edges with the pointer.)

- *Auto Action:* If you select Auto Action for a button, the button activates automatically as soon as it is navigated to, without the viewer needing to press Enter. This is useful in menus, such as scene selection menus, in which you use Next and Previous buttons; you can assume that if viewers navigate to the Next or Previous button, they want to activate it.

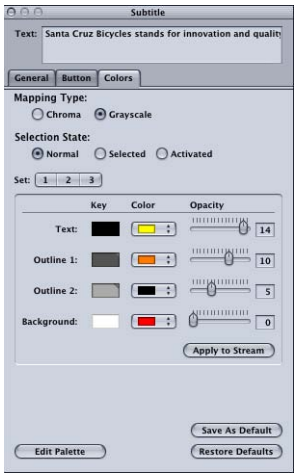
  With overlay-based buttons, if you select this option, only the activated color mapping appears when the button is navigated to, skipping the selected color mapping.

  Important: When viewed with most software-based DVD players, such as the Apple DVD Player, auto action buttons must be clicked if a mouse is used to select buttons. If you use the computer's arrow keys, however, auto action buttons activate automatically as with set-top DVD players.

- *Invisible:* Applies to overlay-based buttons. Allows you to have a button that does not display highlights in the normal, selected, or activated state. This is useful when you want to have a menu with text and no visible buttons. The text could tell the viewer to press the Enter button to go to the next menu or start playback (or whatever the button is set to jump to).

Colors Tab in the Subtitle Inspector

The Colors tab in the Subtitle Inspector is very similar to the Colors tab in the Menu Inspector.



- *Mapping Type:* Select the colors used to create the overlay graphic. This setting only applies to imported graphics files.
  - *Chroma:* Uses black, red, blue, and white
  - *Grayscale:* Uses black, dark gray, light gray, and white.
- *Selection State:* Unless you have configured this subtitle clip to provide buttons over video, only the Normal setting is available. When configured for buttons over video, you can select the button state you want to configure, and that state's colors and transparencies are displayed.
- *Set:* Active only when you have configured this subtitle clip to provide buttons over video. Select the color mapping set (1, 2, or 3) to configure. All new buttons use set 1. See Color Mapping Sets for more information.

  Note: These sets apply only to the selected and activated button states. The normal state color mapping setting applies to the entire overlay graphic unless a button's active area is selected or activated.
- *Key:* Displays the overlay file's colors as selected with the Mapping Type. The names to the left of the key colors (Text, Outline 1, Outline 2, and Background) show which settings apply to subtitle text entered in DVD Studio Pro.
- *Color:* Select the color for each of the four overlay colors from the current Color Palette. If this subtitle is configured to provide buttons over video, you must do this for all three button states.
- *Opacity:* Set the transparency for each of the highlight colors. You can use the slider or enter a value from 0 (completely transparent) to 15 (completely opaque).

- *Apply to Stream:* Click to apply the color and opacity settings to all subtitle clips in this stream.
- *Save As Default:* Click to save this color mapping configuration as the default to be used on all new subtitles you create.

  Note: This is not the same palette used by the Menu Editor.
- *Restore Default:* Click to replace the existing settings with those of the default subtitle color mapping configuration.
- *Edit Palette:* Click to display the Color Palette dialog, which you can use to change colors within the palette. See Color Mapping Palette for more information.

What Happens with Different Aspect Ratios?

There are special considerations when you add subtitles to a track with its display set to one of the 16:9 options, especially if you have subtitles configured to provide buttons over video.

Normal Text Subtitles and 16:9

The text on the subtitles you create in DVD Studio Pro on 16:9 tracks will appear horizontally stretched when viewed on a 16:9 monitor. You can counteract this effect by choosing a narrow font. When a 16:9 track's subtitle plays on a 4:3 monitor using either the letterbox or pan-scan method, the text will appear at its natural, nonstretched width. Additionally, the text is complete, even when you use the pan-scan mode.

Normal Overlay Graphic Subtitles and 16:9

Overlay graphics that you use for subtitles on 16:9 tracks must be anamorphic (horizontally compressed) to display properly when viewed on a 16:9 monitor. If you use nonanamorphic graphics for the subtitles, they will appear horizontally stretched when viewed on a 16:9 monitor.

When a 16:9 track with a graphic subtitle plays on a 4:3 monitor, the entire graphic appears, whether you use the letterbox or pan-scan mode. If you used an anamorphic graphic for the subtitle, it will appear horizontally squeezed when viewed on a 4:3 monitor.

Buttons over Video Using Text Buttons and 16:9

If you create subtitle buttons by typing text and using the text as the buttons on a 16:9 track, the highlights will work as expected when played on a 16:9 monitor.

How the track plays on a 4:3 monitor depends on whether you are using the letterbox or pan-scan mode.

- *If you play the 16:9 track on a 4:3 letterbox monitor:* The highlights will not match the text, because the highlight areas have been scaled along with the video.
- *If you play the 16:9 track on a 4:3 pan-scan monitor:* The highlights will match the text.

Based on this behavior, it is recommended that text buttons not be used when creating buttons over video on a 16:9 track that is set to play in the letterbox mode on a 4:3 monitor.

Buttons over Video Using Overlay Graphic Buttons and 16:9

If you create subtitle buttons by importing an overlay graphic and configuring it for a 16:9 track, the highlights will work as expected when played on a 16:9 monitor.

The highlights will not match the overlay graphic when played on a 4:3 monitor, either letterbox or pan-scan.

- *If you play the 16:9 track on a 4:3 letterbox monitor:* The highlights will be expecting the overlay graphic to be compressed vertically about its center by 25 percent (matching what happens to the track's video).
- *If you play the 16:9 track on a 4:3 pan-scan monitor:* The highlights will be expecting the overlay graphic to have had 12.5 percent of its width removed from both the left and right edges (resulting in a total of 25 percent of the width being removed, matching what happens to the track's video).

In both cases, you can create overlay graphics that compensate for these issues, but not one that will work for both 16:9 and 4:3 playback.

One solution is to create two sets of graphics—one for 16:9 monitors and the other for 4:3 monitors, either letterbox or pan-scan. If you place the graphics on separate subtitle streams at the same timecode, you can use a script to determine how the DVD player is configured and enable the appropriate stream.

See Creating Buttons over Video for more information about using buttons over video.

Viewing Subtitles

To see how your subtitles look over moving video, including the fade in and fade out settings, you must preview or simulate the track.

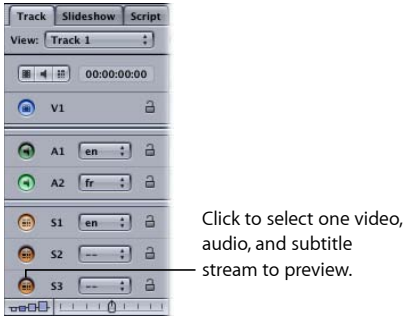
- *Previewing:* Previewing subtitles plays the selected subtitle stream over the video track in the Viewer tab. You are able to switch subtitle streams during playback. However, they switch immediately—not as they would switch with a DVD player. You cannot try out any buttons over video you may have added.
- *Simulating:* Simulating subtitles plays the track in the Simulator. You are able to properly switch subtitle streams during playback and can verify any buttons over video you have configured.

Previewing Subtitles

Before you can preview a subtitle, you need to enable its stream; you can then start playing the track.

To preview a subtitle

1 Select the video, audio, and subtitle streams you want to preview, using the button at the far left of each stream.



See Setting Stream Properties for more information on stream settings.

2 Play the track by clicking the Play button in the Viewer tab.

The track plays from the playhead's current position. Because the playhead automatically jumps to each subtitle clip as you edit them, you need to move it back to the track's beginning if you want to begin playing from there. Alternatively, you can move the playhead to any position on the timeline to start playback at that point.

See Playhead for information on using the playhead. See Viewing a Track for more information on playing tracks.

Simulating Subtitles

DVD Studio Pro provides two ways to start the Simulator: at the First Play connection using Simulator in the toolbar, and at the current track using a shortcut menu in the Outline and Graphical tabs.

Because you may have not yet configured your project so that you can easily navigate to this track from the First Play setting, it is often more convenient to start the Simulator playing at the current track.

To start the Simulator at a specific track

Do one of the following:

- Select the track, then choose File > Simulate Track, or press Command-Option-0 (zero).
- Control-click the track in the Outline or Graphical tab, then choose Simulate Track from the shortcut menu.
- Control-click a stream in the Track Editor, then choose Simulate from Track from the shortcut menu.

Creating Subtitles with DVD Studio Pro

Before you create a subtitle, you must have first created and selected the track where the subtitle will go. Because the contents of the track's video and audio streams typically determine the subtitle placement, you should not start adding subtitles until these streams are set.

Creating a Subtitle Clip

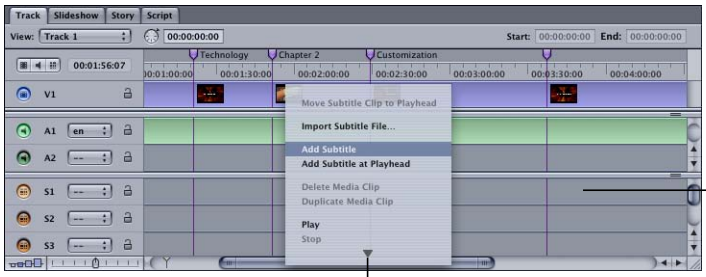
There are several methods you can use to create a new subtitle clip.

Note: Remember that you have to create the subtitle in a subtitle stream (one of the streams labeled S1 to S32), and not in the V1 stream.

To create a new subtitle clip

Do one of the following:

- Double-click in the subtitle stream at the approximate time position where the subtitle clip should appear.
- Position the track's playhead where the subtitle clip should appear, then choose Project > Timeline > Add Subtitle at Playhead.
- Position the track's playhead where the subtitle clip should appear, Control-click in the subtitle stream, then choose Add Subtitle at Playhead from the shortcut menu.
- Position the track's playhead where the subtitle clip should appear, then press Shift-Tilde (~).
- Control-click in the subtitle stream at the approximate time position where the subtitle clip should appear, then choose Add Subtitle from the shortcut menu.



Double-click in a subtitle stream to create a new subtitle.

Control-click in a subtitle stream to open this shortcut menu.

All methods create an empty subtitle, with the duration and colors set in the General and Colors panes in DVD Studio Pro Preferences. Click the Viewer tab to see the video frame that corresponds to the start of the subtitle.

Positioning and Trimming a Subtitle Within a Stream

You can use your mouse or the settings in the General tab in the Subtitle Inspector to adjust the position and duration of the subtitle.

To position and trim a subtitle

1 Change the subtitle's position on the timeline by doing one of the following:
   - Drag it to a new position.
   - Enter a new start time in the General tab in the Subtitle Inspector.
2 Change the subtitle's duration by doing one of the following:
   - Drag one of its edges to a new position. You may need to change the timeline's zoom level to make it easier to see any changes you make, especially if the subtitle clip appears very small. The pointer changes to indicate when you are over an edge and can start dragging it.
   - Enter a new duration in the General tab in the Subtitle Inspector.
   - Enter a new stop time in the General tab in the Subtitle Inspector.

Note: Subtitles cannot cross chapter markers. When you build your project, any subtitle clips that reach a chapter marker are clipped at that point.

Selecting Subtitle Clips

Once you have multiple subtitle clips in a stream, you can use a variety of methods to select one.

To select a subtitle clip in a subtitle stream

Do one of the following:

- Choose Project > Subtitle > Next or Project > Subtitle > Previous.
- Click a subtitle clip in the subtitle stream.
- Click the left and right arrows in the Viewer tab.
- Press the Up Arrow and Down Arrow keys to move the playhead through the timeline, stopping at each clip edge and marker.

Entering Subtitle Text

If you have experience using graphics applications, most aspects of entering subtitle text will be familiar to you. You can type directly in the Viewer tab or in the Text area in the Subtitle Inspector.

To enter subtitle text

1 Do one of the following:
   - If the blinking insertion point is showing in the Subtitle Editor, you can start typing the text. The insertion point automatically appears at the default position in the Subtitle Editor.

- Click in the Text area in the Subtitle Inspector.

2 Type the text. Press Return to start a new line.

Note: When typing text in the Subtitle Editor, press Enter to exit the text entry mode.

You cannot create more than one text entry per subtitle. For example, you cannot enter a sentence, position it in the upper-left corner, and enter a second sentence and position it in the lower-right corner. If you need this functionality, create a graphics file that contains the text as required, and import it into a subtitle. See Importing Graphics Files for Subtitles for more information.

See Setting the Subtitle Font if the font is not the right size or style. See Setting the Subtitle Color if you see the insertion point move, but no text appears in the Viewer tab, or you want the text to be a different color.

You can edit the text by clicking to place the insertion point or selecting existing text and typing new text. You can also drag the text in the Subtitle Editor to a new position.

Copying Text Between Subtitles

You can copy text from one subtitle or other text source to a subtitle. Depending on where you paste the text, you can even maintain the font and size of the copied text:

- *To use the font and size information in addition to the text:* Paste at the insertion point in the Viewer tab. The text's color and justification are not copied.
- *To use only the text:* Paste in the Subtitle Inspector's text entry area. The text uses the subtitle's font and size settings.

To copy text to a subtitle

1 Select the text to be copied.

This text can be from almost any text source, including other subtitles or TextEdit files.

2 Choose Edit > Copy (or press Command-C).

This copies the text to the Clipboard. The selected text is not affected.

3 Select the subtitle to copy the text to, then do one of the following:

- *To add it as new text:* Click the insertion point.
- *To replace existing text:* Highlight the text to be replaced.
- *To add it to existing text:* Place the insertion point where the copied text should go.

Use the Viewer tab to retain the font and size settings of the copied text, or use the Subtitle Inspector's text entry area to use the subtitle's font and size settings.

4 To paste the text, choose Edit > Paste (or press Command-V).

Entering Subtitles in Multiple Languages

One of the great things about subtitles is that you can have a completely different stream for each language. In the Viewer tab, you can type the subtitles on that stream in any language that your system is configured to handle.

When you build the project, the text subtitles are converted to bitmap images. The system on which you build the project (if it is different from the one used to enter the subtitles) must have the proper fonts installed to create the bitmaps. However, once the project is built, the fonts are not required to view the title using DVD players.

You can copy each subtitle clip to a new stream, preserving any attributes, such as fading, fonts, and duration, you have already set.

To copy a subtitle clip from one stream to another stream

Do one of the following:

- Option-drag the existing subtitle clip to the new stream. You can place the clip freely within the stream.
- Shift-Option-drag the existing subtitle clip to the new stream. The subtitle clip is forced to the same timeline position as the original.

Formatting Subtitle Text

You can format your subtitle text in a variety of ways. You get to choose:

- The font family and specific typeface attributes (bold, oblique, and so on)
- The font size
- The colors, including transparency and outlines

You can also mix multiple fonts and sizes within the subtitle, although they must all use the same colors.

Note: You cannot set the color of subtitle text as you do a text object in the Menu Editor. You must choose colors from the Color Palette. See Setting the Subtitle Color for more information.

Setting the Subtitle Font

You can set the font attributes either before or after you type subtitle text.

To set the font attributes

1. To open the Fonts window, do one of the following:
   - Choose Format > Font > Show Fonts (or press Command-T).
   - Click Show Fonts in the toolbar.

The Mac OS X Fonts window opens.

2 If you're making changes to existing text, select the text in the Subtitle Editor by dragging across it.

3 In the Fonts window, select the font family and the typeface style to use. The list of available fonts and styles is based on fonts currently installed on your system.

4 Either select a size in the Size column (use the slider to scroll through the list) or select the existing size and enter the new value, then press the Return key.

Note: If you open a DVD Studio Pro project that uses a font that is not on the computer you are opening it on (either because the font was deleted or the project was created on a different computer), any items using the missing font have a different font substituted with no warning.

To help make the font list manageable, you can assign fonts to collections, creating groupings of similar fonts. This makes it easy to get to a specific font type, such as script or serif. For more information, see Mac OS X Help.

Setting the Subtitle Color

You can set the colors that subtitles are displayed in. As you type text into a subtitle, you are actually creating an overlay graphic, exactly the same as an overlay graphic you might create with a graphics application. As with an advanced overlay, a subtitle contains four colors that you map to the actual colors that are displayed in the finished title. Each color also has a transparency setting. For subtitles, however, the function of each of the four colors is fixed: Color 1 is the text, color 2 is the first text outline, color 3 is the second text outline, and color 4 is the text background.

You usually set the opacity of color 4 (the text background) to 0—other opacity settings apply color 4 over the entire picture (except where the text is). Color 2 (text outline 1) and color 3 (text outline 2) let you apply a text border to help improve the contrast with the video underneath the subtitle. For example, you could set the text to be white and the outlines to be black, making it easy to read the text over light or dark video content.

You choose the colors that appear for each of the four overlays/text functions from a 16-color palette, exactly as you do with the standard menu creation method. You can define the colors in the palette either in the Colors pane in DVD Studio Pro Preferences or by clicking Edit Palette in the Colors tab in the Subtitle Inspector.

Note: The subtitle Color Palette is independent of the menu Color Palette. Changes you make in one do not affect the other.

To set the text colors

1. For each of the four overlays/text functions, choose a new color from the Color pop-up menu. See Color Mapping Palette for details on setting the color palette.
2. Adjust the opacity (0 is completely transparent; 15 is completely opaque) for each color you set.

Note: The Mapping Type setting only applies to imported graphics, and does not affect subtitle text.

Positioning Subtitle Text over the Video

Once you have typed your text and set its font attributes, you can set its final position. There are several tools you can use to set the text's position:

- You can set the default position for subtitles in the Text pane in DVD Studio Pro Preferences. Any new subtitles you type will be placed according to your settings.
- You can drag the text to a new position.
- You can use the buttons in the General tab in the Subtitle Inspector to automatically position the text horizontally and vertically. You can also fine-tune the placement by entering an offset for each direction, which moves the text the distance you specify from the position selected with the Horizontal and Vertical buttons.

The Text pane in DVD Studio Pro Preferences and the General tab in the Subtitle Inspector use similar settings for positioning the text. In both cases, you use horizontal and vertical alignment settings to get it close, and then use the offset settings to position it exactly.

To position subtitle text without dragging

1. Select the horizontal alignment (left, center, or right).
2. Enter an offset value, in pixels, to adjust the position selected with the alignment setting. Positive numbers move the text to the right. Negative numbers move the text to the left. A value of 0 positions the text at its default position for the selected alignment.
3. Select the vertical alignment (top, center, or bottom).
4. Enter an offset value, in pixels, to adjust the position selected with the alignment setting. Positive numbers move the text down. Negative numbers move the text up. A value of 0 positions the text at its default position for the selected alignment.

Note: It's easy to enter an offset value that makes the text disappear completely. If you cannot see the text, enter 0 for the horizontal and vertical offsets.

Importing Graphics Files for Subtitles

You can use graphics files, configured as overlays, to create individual subtitles. These graphics can be drawings or text created using a graphics application. See Creating Overlays for information on creating overlay graphics. You must also use the correct frame size when creating your graphics. See Understanding Pixel Differences in Graphics and Video for information on square pixels and a list of frame sizes to use when creating the graphics.

You can also use graphics in conjunction with typed text. Because the same color mapping settings are used for both the text and graphics, you need to create the graphics with the mapping setting for the four overlay colors in mind.

Importing a Graphics File

There are two approaches you can take to import a graphics file into a subtitle stream:

- Add a subtitle to a stream and import the graphic through the Subtitle Inspector.
- Drag a suitable graphics file directly to a subtitle stream.

In both cases, the graphic uses the normal color settings in the Colors tab in the Subtitle Inspector.

To import a subtitle graphic using the Subtitle Inspector

1. Create a subtitle or select a previously created text subtitle. See Creating a Subtitle Clip.
2. Click Choose in the General tab in the Subtitle Inspector.
3. In the dialog that appears, select the graphics file to use, then click Open.

The graphic appears in the Viewer tab, using the current settings in the Colors tab.

To import a subtitle graphic by dragging

1. Locate the graphics file in the Assets tab, the Palette, or a Finder window.
2. Drag the graphics file to the subtitle stream at the approximate position where it should start.

A new subtitle is created with the duration and color mapping set in the Colors pane in DVD Studio Pro Preferences.

Using Graphics Files to Create an Animation

While subtitles are most often used to present text, the ability to import graphics files into subtitle streams makes it possible to use them for other purposes. For example, the video stream might show a mountain while the subtitle shows the route taken to climb it with a line that gradually grows from the start of the trail to the mountain top.

While you cannot import any kind of a motion asset into a subtitle stream, you can manually create an animation by adding a number of very short (one- or two-frame) subtitles, each with a different graphic that shows the line at a different stage.

Typical text subtitles have little impact on the playback bit rate—on average they run at around 10 kbps. When you use subtitles to create an animation, the impact on the playback bit rate becomes substantial, and may force you to lower the bit rate of the video stream. The DVD specification limits a subtitle stream's bit rate to 3.36 Mbps (about the same as some MPEG-2 video).

The easiest way to create a subtitle animation is to create an STL subtitle file and import it. You can specify the exact duration and position of each graphic, as well as configure the color mapping settings. See Creating an STL Format Subtitle File for more information.

Creating and Importing Subtitle Files

Often you may want to create your subtitles outside of DVD Studio Pro. There can be several reasons for this:

- *To use a facility that specializes in creating subtitles and closed captions:* This can be especially important if you are including subtitles in multiple languages.
- *To free up your DVD Studio Pro system:* Typing a lot of subtitles takes a significant amount of time, especially if you are using multiple languages. This is often a task that can be started well before you start authoring the project.
- *To be able to spell-check the text:* Creating the subtitle text with a text-editing program gives you the ability to take advantage of its spell-checking capabilities.

There are two approaches used to create subtitle files for import into DVD Studio Pro: Use a single file with the text embedded in it or use a group of graphics files, one for each subtitle, with a master file that controls which files appear at which time.

In both cases, the subtitle files can be opened with a text-editing program such as TextEdit. This makes it easy to verify the file's settings and make any necessary modifications. Be sure to save the file in a plain text format if you do make any changes.

Using a Single Subtitle File

When you use the single file subtitle method, you specify a timecode for each subtitle's start and end, as well as the actual subtitle text. You can also embed commands that affect how the text appears on the screen, such as the font, position, color mapping settings, and fade in and fade out settings.

There are two disadvantages of the single file subtitle method:

- It requires your authoring system to have the correct fonts installed. This can be an important issue when working with foreign languages that require special characters.

- The subtitle can only include text characters. However, you can manually import graphics files to use in addition to the imported subtitle file.

Using a Group of Graphics Files

When you use a group of graphics files for the subtitles, each file provides the graphic for one subtitle. A master file provides a list of timecode values for the start and end of each subtitle, along with the name of the graphics file to use for each subtitle.

An advantage of this subtitle method is that the graphics files do not need to actually contain text. This method is useful if you want to include graphics elements along with the text, such as a logo. This also means that the DVD Studio Pro system is not required to have the same fonts you used to create the subtitle graphics.

A disadvantage of this method is that you have to manage a folder with a lot of large graphics files, as compared to the single file method with its single small file.

The graphics files follow the same guidelines as overlay files. See Creating Overlays for more information.

Importing a Subtitle File

Before you import a subtitle file, you will usually have the video asset it relates to in place in the V1 stream. It is also a good idea to have the subtitle preferences configured before importing a subtitle file. Unless the subtitle file specifically overrides them, these preference settings will apply to all subtitles that are imported.

To import a subtitle file

Do one of the following:

- Control-click in the subtitle stream to import the subtitles into, then choose Import Subtitle File from the shortcut menu.
- Select an existing subtitle clip in the stream, then click Import Subtitles in the Subtitle Inspector.

Important: Importing a subtitle file deletes any subtitle clips in that stream that might already be present.

In both cases, a file selection dialog appears for you to choose the file to import. After you choose the file, a dialog appears stating how many subtitles were imported, and the subtitle stream shows clips for each subtitle.

If a Subtitle Import Does Not Work

There are several common reasons why you might have problems when importing a subtitle file.

Wrong Timecode

The most common problem is that the timecode in the subtitle file does not correspond to the asset timecode of the video stream. In some cases, this is due to the original tape's timecode not being entered prior to the video being MPEG-encoded.

To see the timeline's asset timecode, Control-click in the timeline, then choose Asset-Based Timecode from the shortcut menu. You can force an STL format subtitle file to import based on zero-based timecode (which sets the first frame as 00:00:00:00 regardless of the asset's timecode) by setting the $TapeOffset command to False (it is True by default). See Timeline Command for more information.

You can also try importing the subtitle file into a track that has no video assets. This also forces the subtitle clips to import based on zero-based timecode.

Font Not Available

If you are using the single subtitle file method and specify a font to use, a dialog appears if the font is not found on the system, and DVD Studio Pro uses the default subtitle font (as configured in the Text pane of DVD Studio Pro Preferences) as a substitute.

Note: The font must be installed as a Mac OS X font—Mac OS 9 fonts are not used.

Unable to Find the Graphics Files

In most cases, the master subtitle file and the graphics files it uses must be in the same folder. In some cases, however, the master file may be configured to use a separate folder for the graphics files. In this case, the path supplied by the master file must match the actual location where the graphics files are.

How Subtitles Are Positioned

When you import subtitles, they are positioned in the subtitle stream based on the start and end timecode values in the subtitle file and the video stream's asset timecode. This means that the timecode values in the subtitle file must be relative to the asset timecode of the video stream's clip, not to the timeline's zero-based timecode. An exception is when you use an STL format subtitle file, which can choose to use the timeline's zero-based timecode. See Timeline Command for information on positioning subtitles when using an STL format file. See Understanding Time Information in the Track Editor for more information on asset-based versus zero-based timecode.

Editing Imported Subtitles

Once you have imported a subtitle file, you can work with the individual subtitle clips as if you had manually created them. You can reposition them and change their color mapping and any other subtitle attribute. If you imported the subtitles as text from a single subtitle file, you can edit the text. If you imported a group of graphics files as your subtitles, you cannot edit the actual text.

You can also modify all of the subtitles in a stream by using the Apply to Stream controls. See Applying Subtitle Settings to the Stream for more information.

Creating an STL Format Subtitle File

An easy and flexible way to create subtitle files is to use the STL format developed by Spruce Technologies. The STL format allows you to configure most subtitle settings, and change the settings on a subtitle by subtitle basis. It supports both the single file method and the graphics file method, and even allows you to use both methods in the same file.

STL format files can be saved as either plain text files or as RTF files (as created with TextEdit). You must use RTF files if your text contains Unicode characters.

Basic STL Format

There are three parts to an STL format subtitle file: commands, comments, and entries.

- *Commands:* These are preceded by the dollar sign ($). It is these commands that allow you to configure the various aspects of the subtitles, such as their font and position. See STL Commands for more information.
- *Comments:* These are preceded by a double slash (//). These allow you to add text comments throughout the subtitle file without affecting its import.
- *Entries:* These include the start and end timecode values and the text or graphics file for that subtitle clip.

Following is an example of a simple STL subtitle file.

```
$FontName = Arial

$FontSize = 65

//The following subtitles are for scene one.

00:00:12:04 , 00:00:14:12 , Lemurs are the bullies of the wild.

00:00:16:14 , 00:00:19:08 , Here we see them bring down a moose.
```

Commands, which are always preceded by a dollar sign, use the equal sign (=) to separate the command name from its value. The entries use commas to separate their fields. In both cases, you can add tab characters to align the fields and make the file easier to read.

Note: If you add spaces between the comma and the text entry, they are considered part of the text and appear in the subtitle. You can use the tab character to provide space between the comma and the text entry without affecting the text.

You can add a command multiple times within a file to change a setting for specific subtitles.

```
$FontName = Arial
```

```
$FontSize = 65

00:00:12:04 , 00:00:14:12 , Lemurs are the bullies of the wild.

$FontSize = 50

00:00:16:14 , 00:00:19:08 , Here we see them bring down a moose.
```

In this case, both subtitles will use the same font, with the first one at a size of 65 and the second one at 50.

STL Commands

Following is a list of the commands supported by the STL format.

Note: These commands override the settings in DVD Studio Pro Preferences, which provide the default settings for all settings that have not been overridden.

Font Commands

The font commands set all commonly used font properties.

- *$FontName:* Sets the name of the font the subtitles use. Use the family name as it appears in the Fonts window, which can be opened by clicking Show Fonts in the toolbar or choosing Format > Fonts > Show Fonts.
- *$FontSize:* Sets the size of the font.
- *$Bold:* Selects the bold version of the font (if available). Enter True to select the bold version and False to disable it.
- *$Italic:* Selects the italic version of the font (if available). Enter True to select the italic version and False to disable it.
- *$Underlined:* Adds an underline to the subtitle text. Enter True to turn on the underline and False to turn it off.

Color Commands

The color commands choose the colors from the default subtitle Color Palette to apply to the subtitle. The values range from 0 to 15. You can assign the colors to the default Color Palette in DVD Studio Pro Preferences.

- *$ColorIndex1:* Chooses the text color.
- *$ColorIndex2:* Chooses the text's outline 1 color.
- *$ColorIndex3:* Chooses the text's outline 2 color.
- *$ColorIndex4:* Chooses the background color.

Contrast Commands

The contrast commands set the opacity of the colors assigned to the subtitle. The values range from 0 (transparent) to 15 (opaque).

- *$TextContrast:* Sets the opacity of the text color.

- *$Outline1Contrast:* Sets the opacity of the text's outline 1 color.
- *$Outline2Contrast:* Sets the opacity of the text's outline 2 color.
- *$BackgroundContrast:* Sets the opacity of the background color. This is usually set to 0, unless you are using a graphic that does not use white as the background color.

Position Commands

These commands control the subtitle's position.

- *$HorzAlign:* Sets the subtitle's horizontal alignment. You can enter left, center, or right.
- *$VertAlign:* Sets the subtitle's vertical alignment. You can enter top, center, or bottom.
- *$XOffset:* Allows you to modify the subtitle's horizontal position from where the horizontal alignment placed it. The values you enter are in pixels, with positive values moving the subtitle to the right and negative values moving it to the left.
- *$YOffset:* Allows you to modify the subtitle's vertical position from where the vertical alignment placed it. The values you enter are in pixels, with positive values moving the subtitle up and negative values moving it down.

Display Commands

These commands control how a subtitle displays.

- *$ForceDisplay:* Forces the subtitle to display regardless of whether subtitles are turned on by the DVD player. You can enter True (subtitles are forced to display) or False (subtitle display is controlled by the DVD player).
- *$FadeIn:* Sets the fade time used to gradually dissolve the subtitles on. Enter a value in frames.
- *$FadeOut:* Sets the fade time used to gradually dissolve the subtitles off. Enter a value in frames.

Graphics File Command

Use this command if this subtitle file uses graphics files in addition to, or in place of, text entries.

- *$SetFilePathToken:* Sets a token that you use on any subtitle entries that contain a graphics filename instead of subtitle text. The entry must be such that it never appears in normal text or filenames. The normal convention is to surround the text with dual angle brackets, making it easier to locate within an STL file. For example, you could use `_Graphic_`. See Referencing Graphics Files in STL Subtitle Files for details.

Timeline Command

By default, the timecode values in an STL file are in reference to the video stream's zero-based time, which starts at 00:00:00:00. You can use this command to reference the file's timecode values to the video stream's asset-based timecode.

- *$TapeOffset:* Controls how the timecode values in the STL file are referenced to the video stream. You can enter False to reference them to the stream's zero-based timecode (which begins at 00:00:00:00), or True (the default setting) to reference them to the asset-based timecode.

Note: When referenced to the asset-based timecode, the Track Inspector's Track Offset setting is ignored—only the actual asset's timecode is used.

Controls Embedded in the Subtitle Text

You can embed several controls in the text part of the entries. These controls can force a line break and turn on and off the bold and italic font versions.

Line Breaks

Subtitle text does not automatically wrap at the edges of the screen. To make it fit you must either reduce the font size or break it into multiple lines by inserting line breaks. To insert a line break, add the vertical pipe character (|) to the text.

```
00:00:12:04 , 00:00:14:12 , Lemurs are the bullies | of the wild.
```

In the above example, the text will appear as two lines.

Bold, Italic, and Underlined Characters

You can embed controls that change the state of the bold and italic attributes within the text part of an entry.

To change the state of the bold setting, insert an up arrow followed by the letter "B" (^B).

```
00:00:12:04 , 00:00:14:12 , Lemurs are ^Bbullies^B.
```

In the above example, the bold status changes for the word "bullies" only. If the bold attribute had not already been activated, "bullies" would change to bold. If the bold attribute had already been activated, "bullies" would not be bold.

To change the state of the italic setting, insert an up arrow followed by the letter "I" (^I). You can also use bold and italic together.

```
00:00:12:04 , 00:00:14:12 , Lemurs are ^B^Ibullies^B^I.
```

In the above example, the word "bullies" has both the bold and italic attributes change.

To add an underline to portions of the text, insert an up arrow followed by the letter "U" (^U). You can use the underline along with the bold and italic settings.

Referencing Graphics Files in STL Subtitle Files

An STL subtitle file can contain a mix of text subtitle entries and references to graphics files. You must use the $SetFilePathToken command in the file before any lines that reference a graphics file.

```
$SetFilePathToken = _Graphic_

00:00:12:04 , 00:00:14:12 , _Graphic_RabidLemur.tif

00:00:16:14 , 00:00:19:08 , _Graphic_MooseLemur.tif
```

Important: Do not add spaces between the token (`_Graphic_` in this example) and the filename.

The STL subtitle file and the graphics it references must be in the same folder. And, just like the other assets that you import into your project, the graphics files must not be moved, renamed, or deleted until after you build your project.

Creating Buttons over Video

Having buttons appear while a track plays can be a very useful navigational tool, providing the viewer with options that can significantly add to the DVD title's value. For example, you can use buttons over video to allow the viewer to jump from the current track to a track containing related information, such as an interview of an actor, a news clip, or an explanation of how an effect was done.

How Do Buttons over Video Work?

DVD Studio Pro uses subtitles at specially configured markers to provide the buttons over video feature. You configure the buttons exactly as if you were configuring a standard menu using advanced overlays: You create each button's active area, assign its connection, set the button navigation (if you use more than one button), and set up the color mapping for the highlights.

Each subtitle containing buttons over video is tied to a marker. You must create a marker at the point where the subtitle should appear, and another where it should disappear. You can mix standard subtitles in the same stream as button over video subtitles.

You can only view one subtitle stream at a time. Because the buttons over video feature uses a subtitle stream, you effectively disable the normal usage of subtitles on the title while the buttons over video stream is selected. (Although a subtitle clip can have both buttons and subtitle text, often the buttons need to appear longer than normal dialogue text.) In most cases, you would configure the title so that the viewer decides whether to enable buttons over video by selecting a button on a menu. When selected, the subtitle stream that contains the buttons is usually configured to be forced to display so that the viewer does not inadvertently turn it off.

Adding Button Highlight Markers

To create a button over video subtitle, you add a marker at the point where the subtitle should appear, select its button highlight setting, and add a second marker where the subtitle should end. Once you do this, if you create a subtitle between these markers, its start snaps to the marker with the button highlight setting selected and its end snaps to the second marker, regardless of its type.

Any marker can be configured as a button highlight marker. See Working with Markers for information on adding markers to a track.

To configure a marker as a button highlight marker

Do one of the following:

- Control-click the marker, then choose Button Highlight Marker from the shortcut menu.
- Select the marker in the Track Editor. In the Marker Inspector, select the Button Highlight type in the General tab.

You can also select any of the other types available. Depending on the other types you select, at least a part of the marker will change to red. See Working with Markers for more information.

The second marker, which ends the button over video subtitle, can be of any type.

How a Button Highlight Marker Affects the Subtitle Stream

If a subtitle already exists between the two markers that specify the start and end of a button over video subtitle, its duration changes to match the time between the two markers. This is true of all subtitle streams. If you have traditional subtitles on one or more of the other subtitle streams, adding button highlight markers will also affect them. For this reason, you must use care when deciding when and how long to have the buttons over video subtitle appear, so as not to affect existing subtitles.

You can have several subtitle streams in the same track configured for buttons over video. For example, you may be using text for the buttons and want to have different streams for each language. It's important to keep in mind that all button active areas, connections, navigation settings, and color mapping settings are applied to all subtitle streams. The only element that can be different between the streams is the text or overlay you use.

Adding a Button over Video Subtitle Clip

Once you have configured the button highlight marker and the ending marker, you can add the button over video subtitle.

To add a button over video subtitle clip

- Double-click in the subtitle stream between the button highlight marker and the ending marker.

A new subtitle clip appears, with its duration matching the time between the two markers. See the next section, Configuring a Button over Video Subtitle Clip, for information on configuring the subtitle clip to provide buttons over video.

Configuring a Button over Video Subtitle Clip

To configure a button over video subtitle clip, you first add the text or import the graphic to use for the button or buttons, and then configure the buttons much as you would when creating a menu.

Using an Overlay Graphic

The first step to creating a button over video subtitle using an overlay graphic is to import the overlay graphic into the subtitle.

To import an overlay graphic for a button over video

1. Select the subtitle clip that you previously created to configure for buttons over video.
2. Click Choose in the General tab in the Subtitle Inspector.
3. In the dialog that appears, select the graphics file to use, then click Choose.

The graphic appears in the Viewer tab, using the current settings in the Colors tab.

Using Text Buttons

The first step to creating a button over video subtitle using subtitle text is to enter the text in the subtitle. You need to set its font and position before proceeding with creating buttons from it. See Formatting Subtitle Text and Positioning Subtitle Text over the Video for more information.

Creating the Buttons for Button over Video Subtitles

Once you have imported the overlay graphic or entered the button text, you can create the buttons. To create the buttons, you create active area rectangles by dragging over each button's area. See Adding Overlay-Based Buttons for details on this process.

The number of buttons you can have depends on the track's aspect ratio setting, set with the Display Mode pop-up menu in the General tab in the Track Inspector.

See Choosing an Aspect Ratio for more information on these modes. Also see What Happens with Different Aspect Ratios? for issues that occur when creating buttons over video on a 16:9 track.

SD Projects

- *4:3:* You can have up to 36 buttons.
- *16:9 Pan Scan:* You can have up to 18 buttons.
- *16:9 Letterbox:* You can have up to 18 buttons.

- *16:9 Pan Scan & Letterbox:* You can have up to 12 buttons.

HD Projects

- *4:3:* You can have up to 48 buttons.
- *16:9 Pan Scan:* You can have up to 24 buttons.
- *16:9 Letterbox:* You can have up to 24 buttons.
- *16:9 Pan Scan & Letterbox:* You can have up to 16 buttons.

Configuring the Buttons for Button over Video Subtitles

Once you have created the buttons, you need to configure them. There are three areas to configure:

- *Button navigation:* Sets how a viewer jumps from one button to the next using the remote control's arrow buttons.
- *Button targets:* Sets the connection for each button (what is jumped to when the button is activated).
- *Color mapping:* Sets the colors that appear for the normal, selected, and activated button states.

Button Navigation

Configuring button navigation with buttons over video is exactly the same as configuring the navigation in menus. By default, the navigation is assigned continuously, with DVD Studio Pro automatically setting the arrow button actions for each button. You can disable this function and set the navigation manually if you prefer.

See Configuring Button Navigation for details on the methods you can use.

Button Targets

Configuring the targets for each button with buttons over video is almost exactly the same as configuring the button targets in menus. You have the option of setting them in the Connections tab (the buttons appear as marker items), in the Subtitle Inspector, or by using a shortcut menu in the Subtitle Editor.

The difference is that a button within a track cannot select a specific stream in a different track. For this reason, the stream settings for buttons in subtitles are inactive if the target is set to anything other than "not set."

If you need a button within a track to select a specific stream in another track, you can set the target to run a script that's configured to jump to the desired stream.

See Setting a Button's Connection for details on each method.

Color Mapping

Configuring the color mapping for the buttons with buttons over video is similar to configuring the color mapping for an advanced overlay with a menu.

The biggest difference is that you don't have the option of using a simple overlay. You can accomplish a similar effect by setting the color and opacity settings for the three nonwhite overlay colors to the same values, and setting the white overlay opacity to 0, making it completely transparent.

Another difference is that the overlay colors have pre-assigned functions if you are typing subtitle text. See Setting the Subtitle Color for more information.

See Using Advanced Overlay Color Mapping and Colors Tab in the Menu Inspector with Advanced Selected for more information.

Copying Buttons in a Subtitle Clip

You are able to copy buttons within a subtitle clip or to a different subtitle clip. The buttons retain all of their settings, including their target setting.

You are not allowed to copy buttons to a subtitle clip if it causes that clip to exceed the maximum number of buttons allowed. See Creating the Buttons for Button over Video Subtitles for details on the maximum number of buttons allowed.

Copying Buttons by Dragging

You can copy one or more buttons within a subtitle clip by selecting them, then dragging them to a new location.

To copy one or more buttons within a subtitle clip by dragging

1 Select the buttons to be copied.

2 Press the Option key, then drag the buttons to their new position.

If multiple buttons are selected, they all move as a group, maintaining their relationships to each other.

Using Copy, Cut, and Paste

You can use the Copy and Paste commands to copy buttons within a subtitle clip and between subtitle clips. You can even copy buttons from a menu to a subtitle clip. However, any shapes, button styles, button text, and button assets that the menu's button might have are not copied to the subtitle.

Important: If you copy a button to a subtitle clip that is not configured for buttons over video, DVD Studio Pro automatically converts the subtitle clip to support buttons by adding a button highlight marker (named "Button Marker _," where "_" is the button marker number on that track) to the timeline at the clip's beginning, and a cell marker (named "Marker _," where "_" is the cell marker number on that track) at its end.

To copy one or more buttons using copy and paste

1 Select the buttons to be copied.

2 Choose Edit > Copy (or press Command-C).

This copies the selected buttons to the Clipboard. The selected buttons are not affected.

3 Select the subtitle clip to which you want the copied buttons to be pasted.

4 If the insertion point is active in the Viewer tab, click an empty area to deactivate it.

5 Choose Edit > Paste (or press Command-V).

If there are no buttons selected in the subtitle clip before you paste the copied buttons, the copied buttons are placed in the same locations as the originals. If a button is selected in the subtitle clip before you paste the copied items, the copied buttons are positioned relative to the selected button with a small offset.

You can use the Paste command multiple times after using the Copy command. This makes it easy to add a button to multiple subtitle clips.

To move one or more buttons using cut and paste

1 Select the buttons to be moved.

2 Choose Edit > Cut (or press Command-X).

This copies the buttons to the Clipboard and removes the buttons from the current subtitle clip.

3 Select the subtitle clip to which you want the cut buttons to be pasted.

4 If the insertion point is active in the Viewer tab, click an empty area to deactivate it.

5 Choose Edit > Paste (or press Command-V).

This is most useful when you are moving buttons from one subtitle clip to another.

Creating Scripts

20

You can add sophisticated interactivity and control to a project with only a few simple scripts.

This chapter covers the following:

- Introduction to Scripts (p. 477)
- Pre-Scripts (p. 478)
- Scripting Overview (p. 479)
- The Scripting User Interface (p. 480)
- About the Script Tab (p. 481)
- About the Script Inspector (p. 484)
- About the Script Command Inspector (p. 485)
- Creating and Testing Scripts (p. 486)
- Script Command Details (p. 489)
- System Parameter Register Memories List (p. 499)
- System Parameter Register Memories Details (p. 500)
- Using Bit-Wise Operations (p. 511)
- General Purpose Register Memories (p. 512)
- Scripting Examples (p. 517)
- Language Code Table (p. 525)

Introduction to Scripts

The DVD-Video specification includes a simple yet powerful scripting language. This scripting language provides for extensive interactivity between the viewer and the DVD player. DVD Studio Pro gives you full access to these scripting capabilities.

Scripts in DVD Studio Pro are created as separate elements within a project, so they can be assigned easily to any element that supports a script. Scripts can be assigned to buttons or attached to the start or end of any track, story, menu, or marker.

With scripts you can:

- Have the title automatically customize itself to best match the DVD player's configuration in areas such as language selection, audio formats, and parental management
- Add specialized features, such as a random play after a menu times out
- Add subtle features, such as having a menu highlight the next button when returning to the menu after activating a previous button

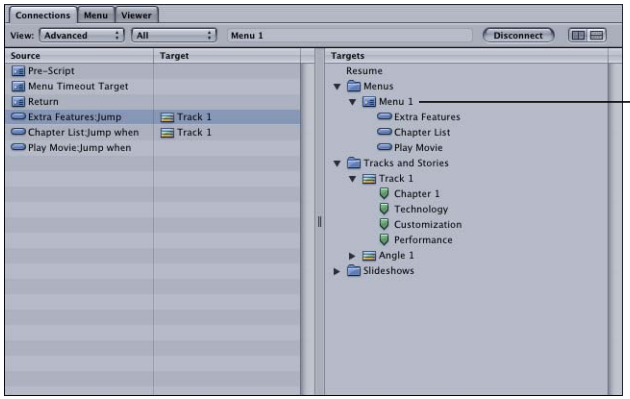
Those are just a few examples of the ways you can customize your DVD project and create a better viewer experience.

Pre-Scripts

Tracks, stories, slideshows, and menus have pre-script settings. A pre-script is a normal script that is run before the element plays or displays. It can be used to do things such as decide whether to play the element or to configure the DVD player before it is played. For example, you may have a pre-script assigned to a track that checks the DVD player's parental management setting to decide whether this track or a different one should play.

Pre-scripts only run if you jump to the root of the element (its name shown in square brackets, or, in the Connections tab, the element's name) they are assigned to.

Choose [Track] to have a pre-script assigned to this track run when it is jumped to.



Connect to the element's name to have the pre-script run.

For example, when you assign a connection to a menu, you can choose to jump to a specific button or to the menu root with no button specified (using the [Menu] selection). A pre-script assigned to a menu only runs if the element that jumped to it had [Menu] selected. If the jump selected a specific button on the menu, the pre-script is skipped.

Similarly, a pre-script on a track or story does not run if you jump directly to a marker. With slideshows, the pre-script does not run if you jump directly to a slide.

In all cases, if you want the pre-script to run, you must jump to the root of the element, indicated by the square brackets.

If an element is also configured with a display condition, the pre-script runs first, and then the display condition.

Note: Unlike pre-scripts, display conditions run when any part of an element is connected to.

Scripting Overview

Scripts you add to your project contain commands that allow you to access the functionality available in all DVD players. Each script can contain up to 124 commands.

Every DVD player contains a micro-controller that can execute a set of commands defined by the DVD-Video specification.

The commands defined in the DVD-Video specification are at the level of microprocessor machine code, with very simple commands used to initiate desired functions. You may find that some of the concepts and terms are a challenge. Therefore, when learning scripting, proceed with initial deliberateness and caution—it is very easy to author titles with scripts that just don't work. You should also use the Simulator and test builds of your project using the Apple DVD Player to verify that your title plays back exactly as intended.

About DVD Player Registers

Each DVD player has two types of memory registers: General Purpose Register Memories (GPRMs, also known as *variables*) and System Parameter Register Memories (SPRMs). Scripts interact with these registers to determine DVD player settings (such as language and parental control) and to control various aspects of disc playback.

Scripts use GPRMs as temporary storage, or "scratch pads," while executing their commands. DVD Studio Pro provides access to eight 16-bit GPRM registers, designated GPRM 0 through GPRM 7 (though they can be renamed). DVD Studio Pro includes the ability to partition seven of these registers into multiple smaller registers. For example, you can partition GPRM3 into four 4-bit registers. Each register is independent of the others, and all are cleared whenever a disc is inserted into the DVD player. The registers can be used as storage locations or as countdown timers.

In contrast, SPRMs have rigidly defined functions. There are 24 of them, designated SPRM 0 through SPRM 23. See System Parameter Register Memories Details for a detailed listing of their functions.

Scripts spend a lot of time copying values from an SPRM to a GPRM, extracting information from the values (for example, determining the language setting), and then acting on that information (selecting the proper audio stream to play). Extracting the information can be challenging, requiring a bit of skill and programming knowledge.

About Scripting Commands

You can choose from ten scripting commands when building your script. Each scripting command has its own set of controls that fit the command's function. Each script can contain up to 124 commands, or operations. Depending on how you configure the scripting command, it might use up to 16 of the 124 commands. The top of the Script Inspector shows the number of commands used and available. A dialog appears to warn you if you create a script with too many commands, and the Script Inspector shows the commands used and available values in red, with a negative number for the Commands Remaining value.

Each scripting command creates a command line that appears in the Script Editor. You are provided with a variety of tools to rearrange the order of the command lines in the script, which is important because the command lines are executed in order (though it is possible for a command line to jump to any other command line in the script).

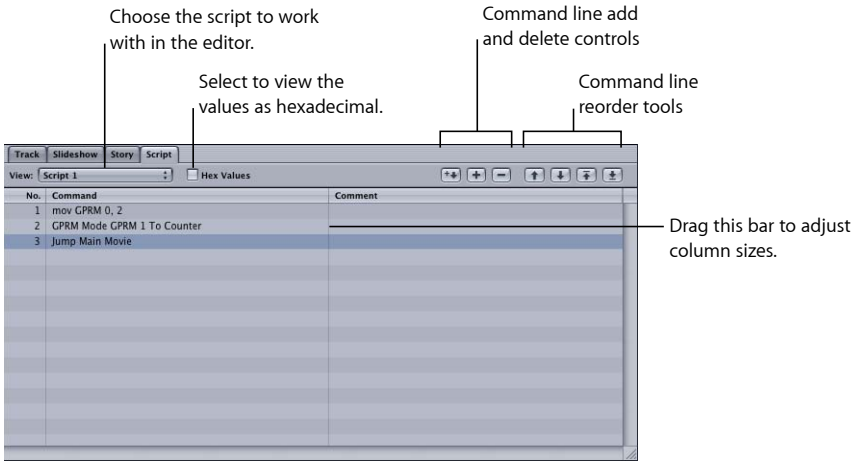
The Scripting User Interface

Scripts appear in the Outline and Graphical tabs. Double-clicking an existing script or clicking the Script tab displays the Script Editor and the Script Inspectors. You use the Script tab to add and remove commands, as well as modify their order. You use the Script Inspectors to configure the commands, choosing the actual command to use and setting its parameters. See the following for details on the items that make up the scripting user interface:

- About the Script Tab
- About the Script Inspector
- About the Script Command Inspector

About the Script Tab

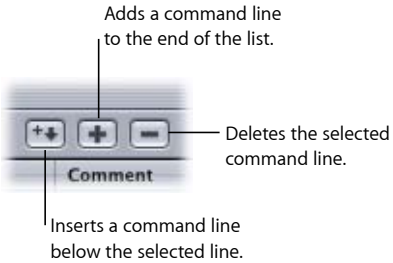
You click the Script tab to access the Script Editor. The Script Editor lists the command lines within the script. You use its Add button to add command lines to the script. The other buttons provide methods for managing the order of the command lines. Because scripts generally execute the command lines in order, starting at command line 1, it is important to have them in the correct order.



Once you have multiple commands in the list, you can move between them by either selecting the one you want to go to or using the keyboard's Up Arrow and Down Arrow keys to step from one to the other. You can also press the Command key along with the Up Arrow and Down Arrow keys to jump to the first or last command line, or the Page Up and Page Down keys to move through the list one page at a time.

Command Line Add and Delete Buttons

There are three buttons you can use to add or remove command lines from the Script Editor.

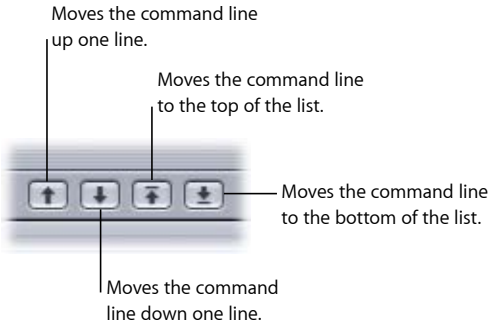


- *Add (+):* Clicking the Add button, or pressing Command–Equal Sign (=), adds a command line to the script. This command line is always placed at the end of the list, regardless of which command is currently selected. By default, each added command line is set to Nop (no operation) which works as a placeholder for the actual command you will select in the Inspector.
- *Delete (–):* Clicking the Delete button removes the currently selected command line from the list. You can also use the keyboard's Delete key.
- *Insert:* Clicking the Insert button, or pressing Command–Shift–Equal Sign (=), adds a new command line to the list, positioned after the currently selected command line. All command lines below the current one ripple down one location. As with the Add button, the new command is a Nop.

Command Line Reorder Tools

You can use the reorder tools to change the order of the command lines in the Script Editor. You can also drag a line to a new position.

Note: You are just rearranging the order of the command lines—you are not deleting or replacing any command lines.



- *Move Up:* Clicking the Move Up button moves the currently selected command line up one location. The command line already at that location moves down one location to make room (the two command lines basically switch positions).
- *Move Down:* Clicking the Move Down button moves the currently selected command line down one location. The command line already at that location moves up one location (the two command lines basically switch positions).
- *Move To Top:* Clicking the Move To Top button moves the currently selected command line to the top of the list, making it the first command line executed. All command lines that were above it in the list ripple down (the command line that was at the top is moved to the number 2 position, the number 2 command line moves to number 3, and so on).
- *Move To Bottom:* Clicking the Move To Bottom button moves the currently selected command line to the bottom of the list, making it the last command line executed. All command lines that were below it in the list ripple up.

Copying Command Lines

When creating a script with multiple similar command lines, you may find it easier to create the first version of the command line, copy that command line multiple times, then modify the copies as needed. You can also copy a command line from one script to another.

To copy command lines in the Script Editor

1. Select the command line to be copied.

   You can select more than one command line.

2. Choose Edit > Copy (or press Command-C).

   This copies the command lines to the Clipboard. The selected command lines are not affected.

3 Select the command line in this script or a different script after which you want to paste the copied command lines.

If you have no command lines selected, the copied command lines are placed after the last existing command line.

4 Choose Edit > Paste (or press Command-V).

To move one or more command lines using cut and paste

1 Select a command line or a group of command lines to be moved.

2 Choose Edit > Cut (or press Command-X).

This copies the command lines to the Clipboard and removes the command lines from the current list.

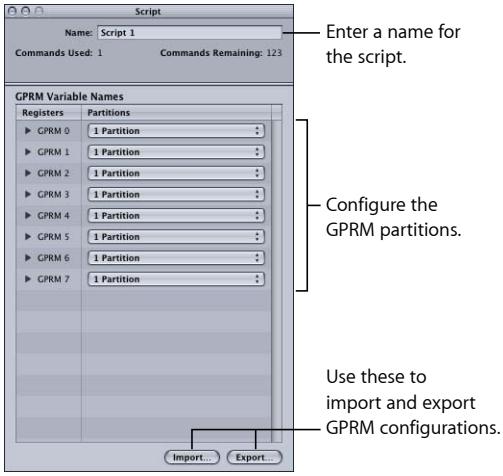
3 Select the command line in the script after which you want the cut command lines to be pasted.

4 Choose Edit > Paste (or press Command-V).

This is most useful when you are moving command lines from one script to another.

About the Script Inspector

A general Script Inspector appears when no command lines in the script are selected. To display the script's Script Inspector, you need to either click in an empty area below the command lines in the Script Editor or click the script's name in the Outline or Graphical tab.



The Script Inspector displays values showing the number of commands used and how many are still available out of the possible total of 124. (Configuring a scripting command may use up to 16 of the 124 commands.) These values will turn red if your script uses more than 124 commands, with a negative number in the Commands Remaining value indicating how many excess commands there are.

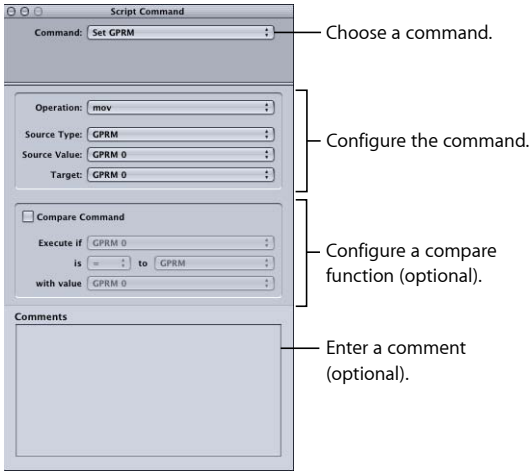
It is also where you name your script and then configure the partitions and names of the GPRM registers.

Note: You can also configure the partitions and names of the GPRM registers in the Advanced tab in the Disc Inspector.

See Configuring GPRM Partitions for more information.

About the Script Command Inspector

A Script Command Inspector appears when you select a command line. To display the Script Command Inspector, you need to select a command line in the Script Editor.



The Script Command Inspector has four sections:

- The command selection section, where you select which of the ten commands to use
- The command setup section, where you configure the command's parameters. The actual contents of this section vary, based on the command selected.
- The compare section, where you can add a compare function to the command
- The comment section, where you can add a comment to the command. Comments are useful for both yourself and others later on when trying to remember why certain commands were added.

See Script Command Details for details on setting up the commands.

Creating and Testing Scripts

While it is easy to create scripts, it's a good idea to first spend some time planning exactly what you intend the script to do. Sometimes a single script can be designed to fit multiple situations, or it may be easier to create multiple similar scripts, with each configured for a specific case.

Creating a Script

Scripts can vary greatly. Simple scripts may contain only one or two commands, while complex scripts can contain many commands and dependencies on other scripts. No matter how complex the script, you create all scripts using the same basic methods.

To create a script

1. Do one of the following:
   - Choose Project > Add to Project > Script, or press Command–Shift–Single Quote (').
   - Control-click in the Outline or Graphical tab, choose Add from the shortcut menu, then choose Script from the submenu.
   - Click Add Script in the toolbar.

   A new script is added to the Outline and Graphical tabs.
2. To name the script, do one of the following:
   - Enter the name in the Name field in the Script Inspector.
   - Select the script in the Outline or Graphical tab, click its name, type the new name, then press Return.
3. Double-click the new script in the Outline or Graphical tab or click the Script tab to open the Script Editor.
4. In the Script Editor, select the default Nop command line.

   The Script Command Inspector appears, displaying the command configuration display.
5. Configure the command line as desired, and add new command lines as needed.

   See Script Command Details for details on the commands you can add to a script. See About Connections for information on connecting scripts to your project's elements.

Duplicating and Saving Scripts

Most scripts contain command lines that are specific to a particular function in a particular project. However, because it is often easier to modify an existing script rather than start from scratch, DVD Studio Pro includes several tools that allow you to create copies of a script for use in this and other projects.

Duplicating Scripts

When creating several similar scripts, use the Outline or Graphical tab's duplication function to make a copy of a script.

To duplicate a script within a project

Do one of the following:

- Select the script in the Outline or Graphical tab, then choose Edit > Duplicate.
- In the Outline or Graphical tab, Control-click the script, then choose Duplicate from the shortcut menu.

A copy of the script is created with the same name as the original, with a number added to the end of the name.

Saving Scripts

You can save a script as an item description file, making it easy to import a script into other projects.

To save a script as an item description file

Do one of the following:

- Select the script in the Outline or Graphical tab, then choose File > Export > Item Description.
- Control-click the script in the Outline or Graphical tab, then choose Save Script from the shortcut menu.

Loading Scripts

You can load saved scripts into a DVD Studio Pro project.

To load a script file

Do one of the following:

- Choose File > Import > Item Description to import a script item description (with an ".dspScript" extension).
- Control-click in the Outline or Graphical tab, then choose Load Script from the shortcut menu.

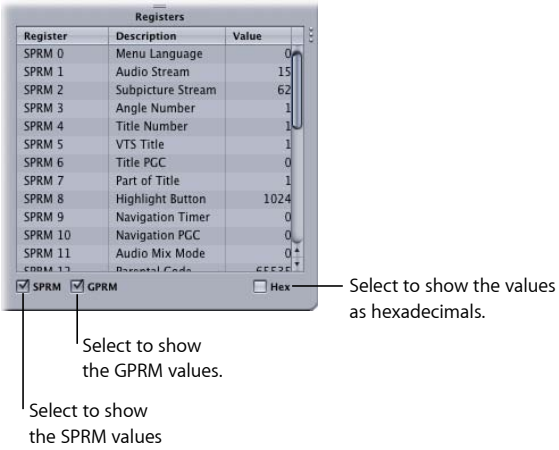
The script appears in the Outline tab under the Scripts heading and as a new tile in the Graphical tab, and can now be edited as needed.

Testing Scripts

Once you have created a script, you will want to test it. Depending on the script's function, you can test it with the Simulator, with the Apple DVD Player as part of an emulator test, or in set-top DVD players after you burn a disc.

Testing a Script in the Simulator

The DVD Studio Pro Simulator has a Registers display that shows useful information when testing a script. The display appears when you click the Simulator's Info button.



You can display either the SPRM or GPRM values, or both at the same time. You can also choose whether the values appear as decimal numbers or hexadecimal numbers. Seeing the SPRM and GPRM values can be useful when you want to ensure the right values are being set in the registers.

Additionally, you are able to enter values into the registers to preset a specific condition you want to test. To enter a value, double-click its existing value and enter the new one. Also, you can name the GPRMs within the Simulator. To name a GPRM, double-click the existing name in the Description column and enter a new one.

The Simulator has several preferences settings that allow you to verify script commands that rely on general DVD player settings, such as language preferences, aspect ratio, and region code. See Simulator Preferences for more information on Simulator preferences.

See Simulating Your Project for more information on using the Simulator.

Testing a Script with DVD Player

The Apple DVD Player provides an additional way to test your scripts. Testing a project with DVD Player is referred to as *emulating* the project. It requires you to build the project, which creates the VIDEO_TS folder that DVD Player uses. See Emulating Your Project Using DVD Player for more information.

Testing a Script on Set-Top DVD Players

The best test to give your scripts is to play the title in a set-top DVD player. This method provides the most real-world experience, giving the scripts the most true tests.

To test scripts in a set-top player, you need to build and format your project, burning it onto a DVD. See Formatting Your Project for more information on burning a DVD.

General Scripting Information

There are a number of good practices to keep in mind when creating your scripts:

- *Plan your GPRM partitioning:* Partitioning one or more of the eight 16-bit GPRM registers can add a lot of flexibility to your script writing by making many GPRM registers available to be used. However, keep in mind that some scripting configurations and display conditions require full 16-bit GPRM registers. Also, when you import a script item description, any GPRMs used by the script must be partitioned exactly the same as they were when the script was originally created. To ensure compatibility, it is a good idea to consistently partition your GPRMs the same way for each project. See General Purpose Register Memories for information on saving and loading GPRM configurations.
- *Don't forget about display conditions:* Menus, tracks, and stories can all have display conditions applied to them. Display conditions work a lot like a simple pre-script—they determine whether the element should play, and if not, provide a jump to an alternative element. One advantage of a display condition is that it is part of the track and is placed in the same video title set (VTS) file as the track—by default, all scripts are placed in VTS 1 (though you can move them to the track's VTS with the VTS Editor). In some cases, there could be a slight delay as the DVD player jumps from one VTS to the other to run a script. An additional advantage is that a display condition executes whether you jump to an element's root or to a part of it (such as a button or marker). See Pre-Scripts and Display Condition for more information.
- *There are many ways to do the same thing:* When creating your script, you will often find that there are alternate ways to accomplish the same task. The simplest approach is often the best, but other considerations, such as a lack of available GPRMs, may force you to be creative in your script writing. Sometimes it is better to create several small scripts rather than one large one that covers all situations.
- *Make sure the script has a way to end:* It is important for the script to have an exit point that terminates its running and returns to playing the disc. For example, if you run a script that only uses the set command to configure some registers, the DVD player will just sit and wait for the script to finish, which it never will.

  You create the exit point by using one of three commands: jump, resume, and exit pre-script. You can use a jump command in any script; however, you can use the resume and exit pre-script commands only in specific script types. See Script Command Details for more information on these commands.

Script Command Details

Scripts can affect a disc's playback in one of two ways:

- Playback can jump to a new location (track or menu).

- A different stream (audio, video, subtitle) can be selected.

Most scripts use several commands to perform these functions. Often, one script may use values placed in a GPRM by a different script that ran earlier.

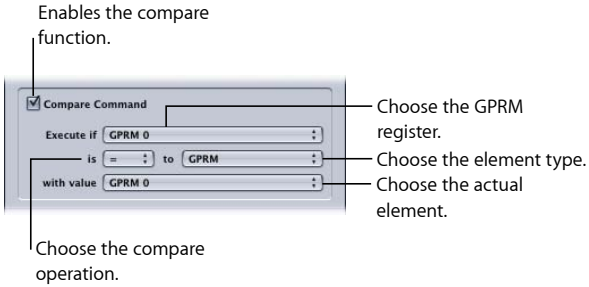
Each of the ten commands has unique settings and uses. Some provide memory read and write functions, some control jumping to elements within the title, and others control how the script executes. These commands can be accessed at the top of the Script Command Inspector.

In addition to the command configurations, each can also use a compare operation that provides a conditional execution function.

Compare Function

You can use the compare function to determine whether or not a command executes (also known as a *conditional instruction execution*). For example, you might set a jump command to go to a track, but use the compare function to make sure the DVD player supports its aspect ratio. If the compare function is not satisfied, the command is skipped and the script moves down to the next command.

A compare function compares a specified element, which you select, with a value in a specified GPRM. You choose how to compare the two elements from a list of operations (equal to, greater than, and so on).



To configure a compare

1. In the Script Command Inspector, select the Compare Command checkbox to activate the compare settings.
2. Choose the GPRM location to compare to the selected element from the “Execute if” pop-up menu.
3. Choose the compare operation type from the “is” pop-up menu.
4. Choose the type of elements to compare from the “to” pop-up menu.
5. Choose the actual element to compare to the GPRM from the “with value” pop-up menu.

Element Types to Compare

You can choose from five different elements to be compared to the selected GPRM.

- *GPRM:* Allows you to select any of the available GPRMs to compare.
- *SPRM:* Allows you to select any of the 24 SPRMs to compare. See System Parameter Register Memories Details for a list of SPRMs.
- *Immediate:* Allows you to enter a decimal value, whose range depends on the size of the selected GPRM register, to compare.
- *Jump Target:* Allows you to select from all available project elements (menus, tracks, stories, slideshows, and scripts) to compare.
- *Special:* Allows you to choose from Current Item, Last Item, and Last Track to compare.
  - *Current Item:* This is this script, unless this is a pre-script. If this is a pre-script, the Current Item is the project element (menu, track, slideshow, or story) the script is assigned to.
  - *Last Item:* This is the project element that started this script running.
  - *Last Track:* This is the last track that was played, even if this script was started by a button on a menu.

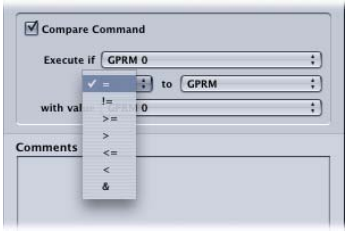
Note: Jump Target and Special require the selected GPRM to be a 16-bit GPRM register. If you choose a partitioned GPRM with the "Execute if" pop-up menu before choosing the element type, Jump Target and Special will not be available. If you choose Jump Target or Special as the element type before choosing the "Execute if" GPRM, partitioned GPRMs will not be available.

GPRMs To Be Compared To

You can select one of the GPRMs to be compared to the selected element. For the values in a GPRM to be meaningful, you must first load something into it with a previous command in this script or from a different script run earlier. This is often done using the set command, but there are several other ways to load a value into a GPRM.

Compare Operations

There are seven compare operations that you can use to compare the selected element to the selected GPRM.



- *= (equal):* Executes the command if the two values are the same.
- *!= (not equal):* Executes the command if the two values are not the same.
- *> = (greater or equal):* Executes the command if the selected GPRM is larger or the same as the selected element.
- *> (greater):* Executes the command if the selected GPRM is larger than the selected element.
- *<= (smaller or equal):* Executes the command if the selected GPRM is smaller or the same as the selected element.
- *< (smaller):* Executes the command if the selected GPRM is smaller than the selected element.
- *& (and):* Performs a bit-wise "and" operation between the two values and executes the command if the bits set to 1 in the selected GPRM are also set to 1 in the selected element. See Using Bit-Wise Operations for information on bit-wise operations.

Note: You need to have a basic understanding of working with binary numbers to be able to use these operations.

Nop Command

The Nop (no operation) command provides a placeholder function. Anytime you add or insert a new step into a script, it is set to Nop. If a script encounters a Nop command while running, it immediately skips to the next command. If the Nop command is the last command, the script stops running and the title stops playing.

Note: When a script is run as a pre-script, it reacts differently to having a Nop as the last command line. With a pre-script, if the last command is a Nop, it is treated as if it were an exit pre-script command, and the element the pre-script is assigned to displays as normal.

Jump Command

Jump commands are usually the last step executed in a script, because they result in another element (menu, track, or script) starting to play.

Note: Being the last step executed is not the same as being the last step in the script. A script might have multiple jump commands in it, with other commands determining which jump to execute.

To configure a jump command

1 In the Script Command Inspector, choose Jump from the Command pop-up menu.

2 Choose the project element to jump to from the Jump To pop-up menu.

GPRM-Based Checkbox

A jump normally goes to a specific part of an element; for example, to button 3 on menu 2. Jumps also have the ability to use a value from a GPRM to determine which button or marker they should go to. This is useful if, instead of jumping to a set location, you want to jump to a place that is flexible, based on a value that a previous script writes to a GPRM.

To jump to a GPRM-based location

1 In the Script Command Inspector, select the GPRM Based checkbox to enable the GPRM selection pop-up menu.

2 Choose the element to jump to from the Jump To pop-up menu. Specific buttons and markers will be unavailable—you can only choose the basic elements (a menu, track, story, and so on).

3 Choose the GPRM to use from the GPRM pop-up menu.

When jumping to menu buttons, you can load the GPRM with the actual button number (1 through 36).

When jumping to markers, you must enter the marker number (1 through 99). Any values you enter above 99 result in the first marker being selected.

Start At Loop Point Checkbox

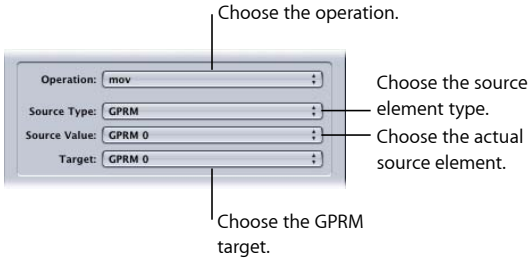
You can add a loop point to your motion menu that defines when the highlights appear and where the menu jumps back to when it reaches the end. A jump to a motion menu normally goes to its start point and begins playing from there. There are times, however, when you might want the jump to go to the loop point instead, ensuring the highlights appear immediately and avoiding forcing the viewer to sit through the first part of the menu.

Selecting the Start At Loop Point checkbox configures the jump to play the menu from the loop point. See About the Motion Settings for more information. See Jumping to a Menu's Loop Point for an example script using this feature.

Set GPRM Command

The set GPRM command is used to determine a value that is then placed in a GPRM location. There are four elements to set:

- *The operation type:* There are 11 operations you can choose from, ranging from a simple move to a "bit-wise exclusive or." See Operation Types for details on using these operations.
- *The source type:* You choose from five possible source element types that can be used as the source. See Source Element Types for details on the element types.
- *The source value:* Once you choose the source element type, you can then choose the actual element. For example, if you choose an SPRM element type, you use this setting to choose the specific SPRM to use as the source.
- *The GPRM target:* You choose a GPRM location where the value gets written. Depending on the operation you choose, this GPRM location may also be the second value in a math operation. For example, if you choose a subtraction operation, the source value is subtracted from the current target value and the result is written to the target location.



To configure a set command

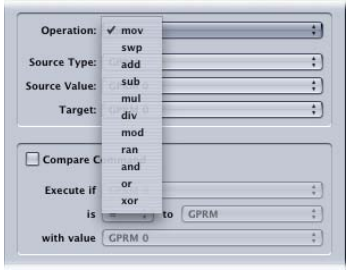
1. In the Script Command Inspector, choose the operation from the Operation pop-up menu.
2. Choose the source element type from the Source Type pop-up menu.
3. Choose the actual source element from the Source Value pop-up menu. The list of elements is determined by the source element type selection set in step 2.

4 Choose the GPRM target from the Target pop-up menu.

Operation Types

There are 11 operations you can choose from to control how the source and target values are handled. There are limitations you need to keep in mind when using these operations:

- Registers have no overflow or underflow flags.
- If the script tries to store a value smaller than 0 or larger than 65535, no error message is given; instead, the value "wraps around." For example, if you subtract 7 from 3, you would normally get –4. But if you do this in a script, 65532 is stored. If you add 6 to 65534 in a script, 4 is stored instead of 65540.



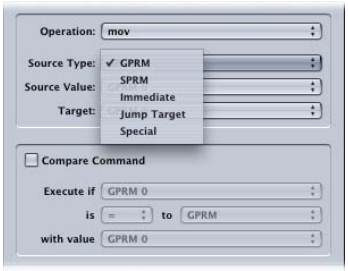
The operation types are:

- *mov:* Moves the source value to the target location, overwriting the existing value in the target.
- *swp:* Swaps the source value with the target value. The source value is written to the target location, and the target value is written to the source location. This is the only operation that writes to the source location.
- *add:* Adds the source and target values together and writes the result in the target location.
- *sub:* Subtracts the source value from the target value and writes the result in the target location.
- *mul:* Multiplies the source value by the target value and writes the result in the target location.
- *div:* Divides the target value by the source value and writes the result in the target location.
- *mod:* Divides the target value by the source value and writes the remainder (modulo) in the target location.
- *ran:* Generates a random value between 1 and the source value and writes the result in the target location.

- *and:* Performs a "bit-wise and" operation between the 16 individual bits of the source and the target values, and writes the result in the target location. The bits that are set (value of 1) in both values are left set. Bits that are not set in one or the other value are reset (value 0).
- *or:* Performs a "bit-wise or" operation between the 16 individual bits of the source and the target values, and writes the result in the target location. The bits that are set (value of 1) in either value are left set. Bits that are not set in both of the values are reset (value 0).
- *xor:* Performs a "bit-wise exclusive or" operation between the 16 individual bits of the source and the target values, and writes the result in the target location. The bits that are set (value of 1) in one or the other value (but not both) are left set. Bits that are or are not set in both of the values are reset (value 0).

Source Element Types

You choose from five different elements to be used as the source type.



- *GPRM:* Allows you to select any of the available GPRMs as the source.
- *SPRM:* Allows you to select any of the 24 SPRMs as the source. See System Parameter Register Memories Details for a list of SPRMs.
- *Immediate:* Allows you to enter a decimal value, whose range depends on the size of the selected GPRM register, as the source.
- *Jump Target:* Allows you to select from all available project elements (menus, tracks, stories, slideshows, and scripts) as the source.
- *Special:* Allows you to choose from Current Item, Last Item, and Last Track as the source.
  - *Current Item:* This is this script, unless this is a pre-script. If this is a pre-script, the Current Item is the project element (menu, track, slideshow, or story) the script is assigned to.
  - *Last Item:* This is the project element that started this script running.
  - *Last Track:* This is the last track that was played, even if this script was started by a button on a menu.

Note: Jump Target and Special require the target to be a 16-bit GPRM register.

Goto Command

The goto command provides a way to jump to a specific line in a script. This is usually used in conjunction with a compare function, with the result determining whether the goto command executes, or whether the script moves on to the next line.

Goto is useful when you build multiple jump commands into your script, because it allows you to choose which jump command to execute by forcing the script to its line.

The only entry (other than the compare settings) is the Line Number value, which is a number from 1 to 124.

Set System Stream Command

The set system stream command provides an easy way to set the audio, subtitle, and video angle streams. You can choose to enable one, two, or all of the three streams. In the case of the subtitle stream, you also choose whether or not it appears.

You choose between two modes to set the stream values:

- *Immediate Value:* Choose the streams directly using their pop-up menus. (Pop-up menu values that say "not set" indicate that no assets are currently assigned to that stream.)

- *GPRM Based:* Choose a GPRM register from each stream's pop-up menu.

Note: You can only choose 16-bit GPRM registers.

To configure the set system stream command

1. In the Script Command Inspector, select either the Immediate Value or GPRM Based modes for stream selection by clicking the appropriate button.
2. Select the streams you want to control by clicking their checkboxes.

3 For each stream you select, use the pop-up menu to choose the stream (Immediate mode) or GPRM register (GPRM mode).

4 If you select the subtitle stream, select the View checkbox to force the subtitle to appear.

Resume Command

The resume command works like the Resume button on a DVD player's remote control—when executed as a step in a script, the disc starts playing from where it last left off.

Note: When the resume command is executed from a pre-script, the result may not match your expectations. Instead of playing the last menu or track that the viewer saw, the track or menu that had the pre-script assigned to it plays instead (which, even though the viewer had not seen it, was the last element "viewed").

GPRM Mode Command

Each 16-bit GPRM register can be set to function as a memory location or as an incrementing counter. By default, all GPRM registers, including those partitioned to smaller registers than 16-bits, are set to be memory registers.

- *Counter mode:* The value loaded into the register increments once per second. This mode can be a useful way to determine how far into the track the viewer has played.
- *Register mode:* A value written to a register remains there until a new value is written or the disc is ejected.

To configure the GPRM mode command

1 In the Script Command Inspector, click either the Counter or Register Mode button to set the selected GPRM's mode.

2 Choose the GPRM register to configure with the Set To pop-up menu.

Only 16-bit GPRM registers appear in the pop-up menu. See Setting a GPRM's Mode for more information.

Exit Command

The exit command provides a way to stop the title from playing back. If, while a script is running, an exit command is encountered, the script stops running and you are prevented from playing the title. For example, you may want to do this in response to the player's region setting.

Exit Pre-Script Command

A pre-script executes as soon as an element is selected. Depending on the purpose of the pre-script, you will often want to have that element display as normal once the pre-script is finished running. The exit pre-script command provides a way to end a pre-script and display the element as normal.

Note: When a script is run as a pre-script, it reacts differently to having a Nop as the last command line. With a regular script, if the last command line is a Nop and the script encounters it while running, the script stops and the title will no longer play. With a pre-script, if the last command is a Nop, it is treated as if it were an exit pre-script command, and the element the pre-script is assigned to displays as normal.

Jump Indirect Command

With the normal jump command, you must specify an element (menu, track, story, slideshow, or script) to jump to, even when using the GPRM Based Button setting.

The jump indirect command provides a way to jump to an element that is entirely determined by a value stored in a GPRM. For example, you could have a script that uses the set command write the current menu's value to a GPRM, and then later on have a second script use the jump indirect command to jump to that same menu by reading that GPRM.

Note: You can only select from the 16-bit GPRM registers.

System Parameter Register Memories List

Each DVD player operates internally via a group of system parameter registers (System Parameter Register Memories, or SPRMs). The status of player operation (which DVD track is playing, what language is being used, and so on) can be read by script commands that access the SPRM status registers.

The following list describes the system parameters that can be read by a script:

- *SPRM 0:* Menu language description code; DVD player setup by user
- *SPRM 1:* Current audio stream number; set by user or program
- *SPRM 2:* Current subtitle stream number; set by user or program
- *SPRM 3:* Current angle number; set by user or program
- *SPRM 4:* Current playing title number (Title); set by DVD player

- *SPRM 5:* Current Video Title Set (VTS) number; set by DVD player
- *SPRM 6:* Current title PGC number; set by DVD player
- *SPRM 7:* Current part of title number (chapter); set by DVD player
- *SPRM 8:* Current highlighted button number; set by viewer in DVD player
- *SPRM 9:* Navigation timer; set by program, then times out
- *SPRM 10:* Timer target; DVD track to play when SPRM 9 times out
- *SPRM 11:* Player audio mixing mode for Karaoke; set by program or DVD player setup
- *SPRM 12:* Country code for parental management
- *SPRM 13:* Parental management level in effect
- *SPRM 14:* Player video configuration (Aspect Ratio, Letterbox Mode)
- *SPRM 15:* Player audio configuration (DTS, AC-3, MPEG, PCM, SDDS)
- *SPRM 16:* Initial language code for audio, DVD player setup by user
- *SPRM 17:* Initial language code extension for audio
- *SPRM 18:* Initial language code for subtitle, DVD player setup by user
- *SPRM 19:* Initial language code extension for subtitle
- *SPRM 20:* Player region code
- *SPRM 21:* Reserved
- *SPRM 22:* Reserved
- *SPRM 23:* Reserved

These SPRMs provide all of the status information and control capability for the scripts.

System Parameter Register Memories Details

In order to use the SPRMs, you need to know what the range of values is for these registers and what that information means. The following sections list the most common bits used when authoring DVDs. All SPRMs are 16-bit values, although only certain bits are described. See Using Bit-Wise Operations for information on using the "bit-wise and" operation to isolate specific bits of the 16-bit value, allowing you to use only those bits that are necessary.

SPRM 0: Menu Language Description Code

Each DVD player has three types of language settings: Menu (SPRM 0), Audio (SPRM 16), and Subtitle (SPRM 18). These values are based on a two-letter code for each language spoken. The code is derived from the lowercase ASCII value of each letter.

For example, the letters “en” represent English. The lowercase “e” is converted to an ASCII value of 101 decimal or 65 in hexadecimal. The lowercase “n” is converted to an ASCII value of 110 decimal or 6E in hexadecimal. When concatenated together in hexadecimal, the value is 656E. The decimal value of 656E is 25966.

See Language Code Table for a complete listing of all of these language values.

It is useful to know the setting of this SPRM when dealing with multiple-language projects. By reading the value of SPRM 0, you can determine the language the viewer wants to see the menus displayed in. For instance, if you have a project that has menus in more than one language, you can display menus in the language the viewer has selected.

SPRM 1: Current Audio Stream Number

The DVD specification allows for up to eight different audio streams. This SPRM lists the current stream being played or the last one selected by the viewer.

The value range for this SPRM is 0 through 7, where 0 is the first stream and 7 is the last stream.

Stream number	SPRM 1 value
1	0
2	1
3	2
4	3
5	4
6	5
7	6
8	7

This information is useful when tracking which audio stream was last selected or played. It is very useful when determining which button to highlight when jumping to a menu where audio streams are selected. This is especially important if the viewer is allowed to change the audio stream while viewing the movie.

SPRM 2: Current Subtitle Stream Number

The DVD specification allows for up to 32 different subtitle streams. This SPRM contains two sets of values.

The first value shows which of the 32 streams is selected. These values range from 0 through 31 with 0 being the first stream and 31 being the last stream. The second value of this SPRM is a display flag that tells you if the subtitle is turned on or off. The flag has a value of 64 for on and 0 for off.

To obtain the value of the stream that is selected and displayed, add 64 to the value of the stream. For example: Stream 1 has a value of 0. If you add that value to the value of the display flag "on" (64), you get a total of 64. Stream 2 has a value of 1; if you add the value of the display flag on (64) to it, you get a total of 65.

The following table lists the possible settings for SPRM 2:

Stream number	SPRM 2 value with the stream selected and display off	SPRM 2 value with the stream selected and display on
1	0	64
2	1	65
3	2	66
4	3	67
5	4	68
6	5	69
7	6	70
8	7	71
9	8	72
10	9	73
11	10	74
12	11	75
13	12	76
14	13	77
15	14	78
16	15	79
17	16	80
18	17	81
19	18	82
20	19	83
21	20	84
22	21	85
23	22	86
24	23	87
25	24	88
26	25	89
27	26	90
28	27	91

Stream number	SPRM 2 value with the stream selected and display off	SPRM 2 value with the stream selected and display on
29	28	92
30	29	93
31	30	94
32	31	95

Similar to SPRM 1, this information is useful to determine the last subtitle stream selected by the viewer. If you have a menu for subtitle selection, you can use this information to highlight the corresponding button for the correct subtitle.

SPRM 3: Current Angle Number

Similar to SPRM 1, the DVD specification allows for up to nine multi-angle MPEG video streams. This SPRM lists the current stream being played or the last one selected by the viewer.

The value range for this SPRM is 1 through 9, where 1 is the first stream and 9 is the last stream (the value does not start at 0 as with SPRMs 1 and 2). If there is only one angle, the default value is 1.

Knowing which multi-angle stream was last selected or played is very useful when determining which button to highlight when jumping to a menu where multi-angle streams are selected. This is especially important if the viewer is allowed to change the multi-angle stream while viewing the movie.

SPRM 4: Current Playing Title Number

Each track, story, and slideshow element in your project is a title. You can have up to 99 titles in your project. All of these are assigned numbers based on their order in the Outline tab's By VTS display. SPRM 4 shows the number for the currently playing element.

If your project does not have stories, the VTS number shown in the Outline tab's By VTS display matches the SPRM 4 value. Because stories are not placed in their own VTS, including them in your project affects the SPRM 4 values. For example, you could have a project with two tracks, with Track 1 in VTS 1 including 2 stories (Story 1 and Story 2) and Track 2 in VTS 2. The SPRM 4 values for this project are:

- Track 1 = 1
- Story 1 = 2
- Story 2 = 3
- Track 2 = 4

SPRM 5: Current Title Number in Video Title Set (VTS)

In projects created with DVD Studio Pro, the title number within the current Video Title Set (VTS) number is 1 for all elements, except stories. Each story within a track is assigned to a higher title number, starting with 2 (the track itself is number 1).

SPRM 6: Current Title PGC Number

In projects created with DVD Studio Pro, the Program Group Chains (PGC) number is 1 for all elements, except stories. Each story within a track is assigned a number, starting with 2 (the track itself is number 1). This value matches the SPRM 5 value except in the case where a track, story, or slideshow has not yet been played. In that case, it is set to 0.

SPRM 7: Current Part of Title Number

The Part of Title is the current chapter number of the track being played.

This SPRM is useful if you need to know the last or current chapter played for that track. There may be reasons to jump to the beginning of the last chapter played from any menu, not just resume to the last place in the video. An example of this would be a training film that requires the viewer to resume watching the chapter from the beginning if they do not watch the chapter in its entirety.

SPRM 8: Current Highlighted Button Number

This SPRM is the last button number of the current or last menu displayed. You can use this SPRM to track the last button position that the viewer selected. The value is calculated by multiplying the button number by 1024 (this SPRM uses bits 10 through 15 to count the buttons).

The table below lists the button number and its value:

Button number	SPRM 8 value
1	1024
2	2048
3	3072
4	4096
5	5120
6	6144
7	7168
8	8192
9	9216
10	10240
11	11264

Button number	SPRM 8 value
12	12288
13	13312
14	14336
15	15360
16	16384
17	17408
18	18432
19	19456
20	20480
21	21504
22	22528
23	23552
24	24576
25	25600
26	26624
27	27648
28	28672
29	29696
30	30720
31	31744
32	32768
33	33792
34	34816
35	35840
36	36864

SPRM 9: Navigation Timer

This is the timer used to count down pauses and still frames. DVD Studio Pro automatically loads this timer for timeouts and pauses. There is no real use for it in scripts.

SPRM 10: Timer Target

This SPRM is used in conjunction with SPRM 9. It is loaded with the PGC that is activated when the Navigation Timer (SPRM 9) expires.

It is loaded and set by DVD Studio Pro, and there is no real use for it in scripts.

SPRM 11: Player Audio Mixing Mode for Karaoke

Karaoke-capable DVD players can blend several audio streams together.

Note: Refer to SPRM 15 to identify whether or not a DVD player is karaoke-capable.

The primary stream is usually a music-only track in stereo (L and R). It is usually stream number 1 or 2. To those streams you can mix a melody stream (M) or vocal streams (V1 and V2). The melody stream and the vocal streams are usually stream numbers 3, 4, and 5. The values of SPRM 11 are listed in the table below:

Bit description	Bit	Bit value
Reserved	0	1
Reserved	1	2
Stream 3 added to stream 1	2	4
Stream 4 added to stream 1	3	8
Stream 5 added to stream 1	4	16
Reserved	5	32
Reserved	6	64
Reserved	7	128
Reserved	8	256
Reserved	9	512
Stream 3 added to stream 2	10	1024
Stream 4 added to stream 2	11	2048
Stream 5 added to stream 2	12	4096
Reserved	13	8192
Reserved	14	16384
Reserved	15	32768

The value can be any combination of the above values (excluding reserved) with 0 indicating that no streams are added. A value of 3072 indicates that streams 3 and 4 are added to stream 2 (1024 + 2048).

SPRM 12: Country Code for Parental Management

This SPRM lists the intended country code for the disc's parental management feature. For the United States this is 840.

SPRM 13: Parental Management Level

SPRM 13 lists the parental management level that the DVD player is currently set for. This is set by the viewer and is used to prevent children from watching movies with mature content.

SPRM 13 can be useful in several ways. In some cases there may be more than one version of a single movie on a single DVD disc. Larger discs such as DVD-9s can contain both the R- and PG-rated versions of the same movie. By reading the value of SPRM 13, you could determine which version of the movie to play.

Another use for SPRM 13 is to check the DVD player's current parental setting. If the disc is rated higher than the DVD player is currently set for, you could have a script that jumps to a menu explaining that the disc cannot be played unless the player's parental setting is changed.

Important: DVD Studio Pro does not include a parental rating in its projects, so all DVD players that support parental management will set SPRM 13 to 15 when playing a DVD Studio Pro authored disc.

Below is a list of the numeric values of SPRM 13.

MPAA rating	SPRM 13 value
G	1
—	2
PG	3
PG-13	4
—	5
R	6
NC-17	7
—	8
Disc not rated	15

SPRM 14: Player Video Configuration

Every DVD player has several modes of video display. These are divided into the display mode and the aspect ratio. By reading SPRM 14 you can tell what modes the player is currently in. Bits 8 and 9 of SPRM 14 are used to determine the current display mode (whether the video needs processing for display on a 4:3 monitor) and bits 10 and 11 are used to determine the aspect ratio of the monitor (4:3 or 16:9). The first eight bits in SPRM 14 are not used.

The following table shows the combinations for the display mode bits.

Display mode	Bit 8	Bit 9	Total
Normal (no processing)	0	0	0
Pan-scan	256	0	256
Letterbox	0	512	512
Reserved	256	512	768

The following table shows the combinations for the aspect ratio bits.

Aspect ratio	Bit 10	Bit 11	Total
4:3	0	0	0
Not specified	1024	0	1024
Reserved	0	2048	2048
16:9	1024	2048	3072

SPRM 15: Player Audio Configuration

Each DVD player can have several types of audio capabilities. Most players can handle Dolby Digital (AC-3), Linear PCM, and MPEG Audio. There are other audio options such as DTS and SDDS, as well as karaoke capabilities.

By reading the values of SPRM 15, you can see which audio options the player has. This could be useful if you have two types of audio streams and want to play the proper one for that player. For example, if the player is capable of Dolby Digital (AC-3) audio, you might want to play that stream instead of a stereo PCM stream.

Here is a table of the values for SPRM 15:

Player audio configuration	Bit	Bit value
Reserved	0	1
Reserved	1	2
SDDS karaoke capability (option)	2	4
DTS karaoke capability (option)	3	8
MPEG karaoke capability first bit	4	16
MPEG karaoke capability second bit	5	32
AC-3 karaoke capability	6	64
PCM karaoke capability	7	128
Reserved	8	256
Reserved	9	512
SDDS capability (option)	10	1024
DTS capability (option)	11	2048
MPEG capability first bit	12	4096
MPEG capability second bit	13	8192
AC-3 capability	14	16384
Reserved	15	32768

Bit 4 (MPEG karaoke capability first bit) is off when the player is not MPEG karaoke-capable, and on when it is. Bit 5 (MPEG karaoke capability second bit) is always off.

Bit 12 (MPEG capability first bit) is off when the player is not MPEG capable, and on when it is. Bit 13 (MPEG capability second bit) is always off.

There is no bit for regular PCM capability because all players must support it.

SPRM 16: Initial Language Code for Audio

This SPRM is the initial audio language that the viewer has set the DVD player to. It can be assumed to be the primary spoken language that the viewer wants to hear.

As with SPRM 0, these values are derived from a two-letter code for each language spoken. The code is derived from the lowercase ASCII value of each letter. See Language Code Table for a complete table of all of these language values.

It is useful to know the setting of this SPRM when dealing with multiple-language projects. By reading the value of SPRM 16, you can determine the spoken language that the viewer wants to hear. If you have a project that has audio streams in more than one language, you can play the appropriate spoken language that the viewer has selected. If the viewer must choose a language from an audio menu, this SPRM value can be used to select the appropriate button highlight.

SPRM 17: Initial Language Code Extension for Audio

SPRM 17 is rarely used but has several values. It can be used to flag an audio stream as audio for the visually impaired or for director's commentary.

Contents	SPRM 17 value
Not specified	0
Normal captions	1
Audio for visually impaired	2
Director's comments 1	3
Director's comments 2	4

SPRM 18: Initial Language Code for Subtitle

SPRM 18 is the value of the initial subtitle language setting of the DVD player. It is a preference set by the viewer.

Many feature films that are put onto DVD are subtitled in several languages. By reading this SPRM, you can preselect the appropriate subtitle stream to the viewer's preferred language. In the case of a subtitle menu, you can preselect the appropriate button highlight.

As with SPRM 0, these values are derived from a two-letter code for each language spoken. The code is derived from the lowercase ASCII value of each letter. See Language Code Table for a complete table of all of these language values.

SPRM 19: Initial Language Code Extension for Subpicture

Similar to SPRM 17, SPRM 19 is an extension code for more in-depth information about the subtitle stream. It covers such areas as subpicture size or whether the subtitle stream is for children.

Contents	SPRM 19 value
Not specified	0
Captions with normal size characters	1
Captions with larger size characters	2
Captions for children	3
Reserved	4
Closed captions with normal size characters	5
Closed captions with larger size characters	6
Closed captions for children	7
Reserved	8
Forced captions	9
Reserved	10
Reserved	11
Reserved	12
Director's commentary with normal size characters	13
Director's commentary with larger size characters	14
Director's commentary for children	15

SPRM 20: Player Region Code

In order to have some control over which parts of the world can play a disc, a regional coding system was developed. With this system, all standalone DVD players are manufactured to support a single region, and DVD players used by computers have a setting that configures the player's region (with a limited number of changes allowed).

This SPRM returns the value of the DVD player's region code.

The globe is divided into eight sections:

- *Region 1:* Canada, United States, Puerto Rico, Bermuda, the Virgin Islands, and some islands
- *Region 2:* Japan, Western Europe (including Poland, Romania, Bulgaria, and the Balkans), South Africa, Turkey, and the Middle East (including Iran and Egypt)
- *Region 3:* Southeast Asia (including Indonesia, South Korea, Hong Kong, and Macao)
- *Region 4:* Australia, New Zealand, South America, most of Central America, Papua New Guinea, and most of the South Pacific
- *Region 5:* Most of Africa, Russia (and former Russian states), Mongolia, Afghanistan, Pakistan, India, Bangladesh, Nepal, Bhutan, and North Korea
- *Region 6:* China and Tibet
- *Region 7:* (Reserved)
- *Region 8:* Airlines, cruise ships, and other types of transportation

Here is a table of regions and values for SPRM 20:

Region	SPRM 20 value
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

Using Bit-Wise Operations

More often than not, when working with the SPRM values, you will only be interested in certain bits of each 16-bit value. The "bit-wise" operations (and, or, and exclusive or), make it possible to mask the bits that are not needed, allowing you to determine the states of the specific bits you need.

Note: You need to have a basic understanding of working with binary numbers to be able to use these operations.

Suppose you need to find out whether the DVD player is configured for a 4:3 or 16:9 aspect ratio monitor. To determine this, you only need to look at bits 10 and 11 of SPRM 14. You can use the "bit-wise and" operation to mask all bits except 10 and 11, making it possible to easily determine the aspect ratio status without having to be concerned with the other bits.

Bits	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SPRM 14	x	x	x	x	0/1	0/1	x	x	x	x	x	x	x	x	x	x
And value	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Result	0	0	0	0	0/1	0/1	0	0	0	0	0	0	0	0	0	0

Referring to the above table, the x's in the SPRM 14 value represent bits that are not needed. Bits 10 and 11 use "0/1" to indicate bits that you want to retain—these may be set to either 0 or 1. When performing an AND operation, placing 0 in the bits you want to mask results in their being cancelled out, regardless of their state. Placing 1 in the bits you want to retain passes them to the result as is—a 0 is still a 0 and a 1 is still a 1. In this case, an AND value of 3072 produces the proper masking.

The value of the result produces four possible answers: 0, 1024, 2048, and 3072. In the case of SPRM 14, 0 indicates the DVD player is set to 4:3, and 3072 indicates it is set to 16:9 (the values of 1024 and 2048 are either not specified or reserved).

General Purpose Register Memories

The General Purpose Register Memories (GPRMs) provide memory storage that can be used when building scripts. Unlike System Parameter Register Memories (SPRMs), GPRMs are not used directly by the DVD player—they are only used by scripts. Values, such as an SPRM or a value you specify, can be written to a GPRM, have a math operation applied to it, and can then be used by a script command to control the DVD player.

DVD Studio Pro provides access to eight 16-bit GPRMs. Each register is completely independent of the others. All of the registers are set to 0 when a disc is inserted into the DVD player.

When creating scripts, you may find that you could use an additional GPRM or two. Because you will often not need the full 16-bits of a GPRM register, you are able to increase the number of GPRM registers by partitioning one or more of them into smaller sizes. For example, you could choose to partition GPRM 1 into four 4-bit registers. This makes it possible to greatly increase the usable number of GPRMs available when creating your scripts.

Important: Several script command configurations and display conditions require the use of full 16-bit GPRM registers. For that reason, you are only allowed to partition seven of the eight 16-bit GPRM registers.

About SPRMs and Partitioned GPRMs

SPRMs fall into one of three categories:

- Those that use the first bits of their register, such as SPRM 1
- Those that use part of the register, but not the first bits, such as SPRM 14 which uses bits 8 through 11
- Those that use the entire register, with each bit representing the status of a function, such as SPRM 15

If you partition a GPRM into four 4-bit registers, then move the same SPRM value into each register, each of the 4-bit registers would get the same first four bits of the SPRM.

As an example, while SPRM 14 only uses four bits of its register, because they are not the first four bits, they cannot be moved into a partitioned GPRM register. For this reason, it is recommended that you always keep several 16-bit GPRMs available.

Configuring GPRM Partitions

You are able to individually configure the partitions of each 16-bit GPRM register using either the Script Inspector or the Advanced tab of the Disc Inspector. Once configured, you are then able to name them and save the configuration, which can then be loaded into a different project.

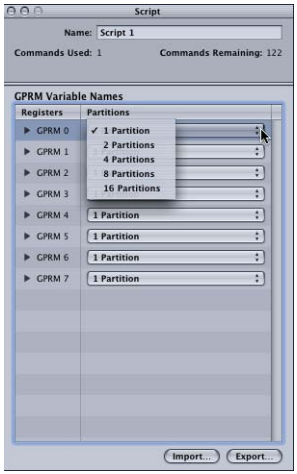
Important: Once you partition a GPRM register and use it in a script, you cannot change the GPRM's partition settings. You also cannot import a script's item description unless the GPRMs it uses are partitioned the same as when the item description was saved.

To configure a GPRM's partition

1 Do one of the following:

- Select a script in the Outline or Graphical tab. The Script Inspector appears.
- Select the disc in the Outline tab, then click the Advanced tab in the Disc Inspector.
- Click an empty area in the Graphical tab, then click the Advanced tab in the Disc Inspector.

2 Click the pop-up menu for the GPRM you want to partition, then choose the partition configuration to use from the pop-up menu.

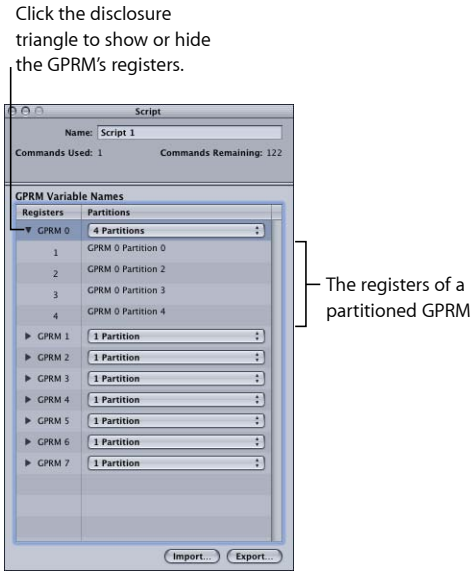


You can choose from the following:

Partition configuration	Result	Range of each register
1 Partition	One 16-bit register	0-65535
2 Partitions	Two 8-bit registers	0-255
4 Partitions	Four 4-bit registers	0-15
8 Partitions	Eight 2-bit registers	0-3
16 Partitions	Sixteen 1-bit registers	0-1

Note: Any GPRMs that are currently used by a script have their pop-up menus deactivated and cannot have their partition configuration changed.

Once you choose the partition configuration to use for that GPRM, it displays the new registers.



Naming the GPRM Partitions

To help manage the process of creating a script, you are able to name each of the GPRM partitions. (Even a 16-bit GPRM is considered to have one partition.) This makes it easier to keep track of which GPRMs are being used for what purpose. Because the GPRMs are shared by all scripts, once you name one, that name appears in all places it is used in all scripts. You can name GPRMs in either the Script or Disc Inspector.

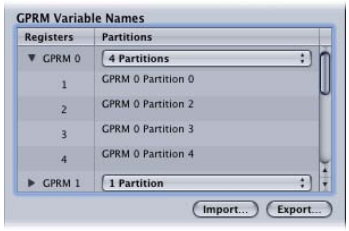
Note: All partition names must be unique.

To name a GPRM

1 Do one of the following:

- Select a script in the Outline or Graphical tab. The Script Inspector appears.
- Select the disc in the Outline tab, then click the Advanced tab in the Disc Inspector.

- Click an empty area in the Graphical tab, then click the Advanced tab in the Disc Inspector.



2 Click a GPRM's disclosure triangle to show its partitions.

3 Double-click the partition name and type the new name in the text entry box for the GPRM you want to rename.

Note: You can also change a GPRM partition's name in the Simulator's Registers display.

Importing and Exporting GPRM Configurations

If you find yourself needing to copy scripts from one project to another (using item descriptions), you will find that it is much easier if you can be sure that each project uses the same GPRM configuration. One way to do this is to export the GPRM configuration from the project with scripts you want to copy from, and then import that GPRM configuration into the project you want to copy the script into.

Important: You can only copy a script from one project to another project if the GPRMs used by the script are partitioned the same way in both projects.

When you export a GPRM configuration, a file is created that contains the partition information for each of the GPRMs plus their names.

When you import a GPRM configuration, the GPRMs are changed to match those in the file, including the names. Some things to keep in mind:

- Any GPRMs that are already in use by a script will not be reconfigured, and a warning will appear. All other GPRMs will be reconfigured.
- The names of all GPRM registers are changed to match those in the file you are importing. Any GPRMs that are already in use are not affected.

To export a GPRM configuration

1 Configure the GPRM register partitions, including changing their names if needed.

2 Do one of the following:

- Click the Script Inspector's Export button.
- Click the Export button in the Advanced tab of the Disc Inspector.

The Export dialog opens.

3 Enter a name for the file, select its destination, and click Export.

A file is created using the name you entered plus a ".dspPartition" extension.

To import a GPRM configuration

1 Do one of the following:

- Click the Script Inspector's Import button.
- Click the Import button in the Advanced tab of the Disc Inspector.

The Import dialog opens.

2 Select the file to import, then click Import.

Note: To avoid configuration conflicts, you should import the GPRM configuration before creating any scripts.

Setting a GPRM's Mode

Each 16-bit GPRM register can be set to function as a memory register or as a decrementing counter.

Note: By default, all GPRM registers, including those less than 16-bits, are set to be memory registers.

- *Register:* A value written to it remains there until a new value is written or the disc is ejected.
- *Counter:* As a counter, the value counts up once per second, starting at the GPRM's current value. You can pause the count by changing the mode back to register.

You set a GPRM's mode using the GPRM Mode command as part of a script. Once you have set a GPRM's mode, it stays that way until it is changed or the disc is ejected.

Scripting Examples

By their nature, scripts tend to be very project-specific. While the function of a particular script might apply to a wide variety of projects, the specific tracks, streams, and menus it works with vary.

The following examples provide you with step-by-step instructions that can help you understand the process of creating a script, from the initial concept to the final product. These scripts show just one way to accomplish their tasks—alternate ways to accomplish the same results often exist.

Note: These examples use menu and track names that are fictitious. You can create these elements and add suitable assets to them, or adapt these examples to your existing assets. You can even create these as empty elements, with no assets assigned. It is the names of the elements that get used in these script examples, not the actual assets. Additionally, these examples assume you have not partitioned the GPRMs.

Jumping to a Menu's Loop Point

For this script, the project has a motion menu that has a loop point set, and you want to be able to have other elements jump directly to the loop point, bypassing the first part of the menu's video.

For this script, you'll call the menu Main Menu.

To create a Jump to Loop Point script

1. Do one of the following:
   - Choose Project > Add to Project > Script, or press Command–Single Quote (').
   - Click Add Script in the toolbar.
2. Double-click the new script in the Outline or Graphical tab.

   The Script Editor opens and the Script Inspector appears.
3. In the Inspector, name the script `Jump to Loop Point`.
4. In the Script Editor, select the first command line (Nop).

   The Script Command Inspector appears.
5. In the Script Command Inspector, choose Jump as the command.
6. Choose Menus > Main Menu > [Menu] from the Jump To pop-up menu.
7. Select the Start At Loop Point checkbox.

You can use this script anyplace where you might normally jump to the Main Menu. For example, you could set a track's End Jump to run this script—when the track finishes playing, it jumps to the Main Menu's loop point.

Randomly Playing Tracks

For this script, the project has four tracks, and you want a script to randomly choose one to play once a menu times out (has been inactive for a set amount of time).

For this script, you'll call the tracks "Ocean," "Beach," "Trail," and "Shopping."

To create a Random Play script

1. Do one of the following:
   - Choose Project > Add to Project > Script, or press Command–Single Quote (').
   - Click Add Script in the toolbar.
2. Double-click the new script in the Outline or Graphical tab.

The Script Editor opens and the Script Inspector appears.

3 In the Inspector, name the script `Random Play`.

4 In the Script Editor, select the first command line (Nop).

The Script Command Inspector appears.

5 In the Script Command Inspector, choose Set GPRM as the command.

6 To configure the set GPRM command:

a Choose "ran" as the Operation.

b Choose Immediate as the Source Type.

c Enter 4 as the Source Value.

d Choose GPRM 0 as the Target.

The above settings generate a random number between 1 and 4 and place the value in GPRM 0. It is this value that is looked at by the next commands in this script to determine which track to play.

7 In the Script Editor, click the Add button.

The next command line is added to the script.

8 In the Script Command Inspector, choose Jump as the command.

9 To configure the jump command, choose Tracks and Stories > Ocean > Marker 1 from the Jump To pop-up menu. This plays the first of the four tracks, depending on the result of the compare function added next.

Note: Remember that the Ocean track is fictitious. Unless you created a track called *Ocean*, you won't see it in this pop-up menu.

10 Add a compare function to the jump command to test to see if this track has been selected with the random generator.

a Select the Compare Command checkbox.

b Choose GPRM 0 as the "Execute if" element to be compared to.

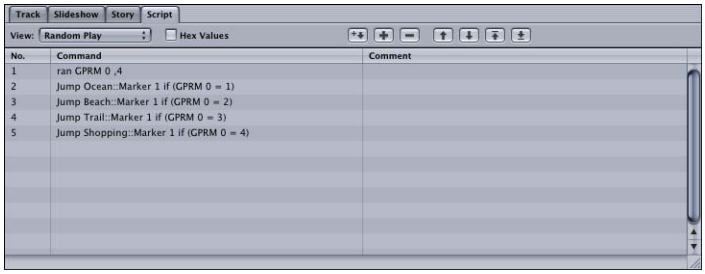
c Choose equal (=) as the "is" compare operation type.

d Choose Immediate as the "to" element type to compare.

e Enter 1 as the "with value."

If GPRM 0 has a 1 in it (generated by the random number generator command), this jump command occurs. If not, the script moves to the next command.

11 Add three additional jump command lines—one for each of the other three fictitious tracks. The only differences are the Jump To settings which need to match each track (Tracks and Stories > Beach > Marker 1; Tracks and Stories > Trail > Marker 1; and Tracks and Stories > Shopping > Marker 1) and the immediate values in the compare function's "with value" field (use 2 for the Beach track, 3 for the Trail track, and 4 for the Shopping track).



12 You need to configure the menu's timeout setting by selecting the menu in the Outline or Graphical tab, then clicking the General tab in the Menu Inspector. Choose Timeout from the At End pop-up menu and enter a value (in seconds) for the timeout. Choose this script (Random Play) from the Action pop-up menu.

Each time the menu sits idle for the specified amount of time, the script starts, generates a random number, and then plays one of the four tracks. Once the track ends, it jumps to the element specified by its End Jump setting.

Playing All Tracks

For this script, the project has four tracks, each with a button on the main menu to start it playing. You want to add a Play All button that will play all four tracks in order, returning to the main menu once they have finished. In this case, you will create five scripts—one that starts the Play All progress and one for each track that determines whether a Play All function is active.

The Play All script places a value in a GPRM that indicates to the other scripts that a Play All function is in process. It then jumps to the first track and starts it playing.

The other scripts are linked to each track's End Jump settings. These scripts test to see if the Play All function is active. If it is, the script jumps to the next track. If not, the script jumps back to the main menu.

For this script, you'll call the tracks "Ocean," "Beach," "Trail," and "Shopping."

The Play All Script

This is the script you will link to the main menu's Play All button.

To create the Play All script

1 Do one of the following:

- Choose Project > Add to Project > Script, or press Command–Single Quote (').
- Click Add Script in the toolbar.

2 Double-click the new script in the Outline or Graphical tab.

The Script Editor opens and the Script Inspector appears.

3 In the Script Inspector, name the script `Play All`.

4 In the Script Editor, select the first command line (Nop).

The Script Command Inspector appears.

5 In the Script Command Inspector, choose Set GPRM as the command.

6 To configure the set GPRM command:

a Choose "mov" as the Operation.

b Choose Immediate as the Source Type.

c Enter 1 as the Source Value.

d Choose GPRM 0 as the Target.

The above settings place the value 1 in GPRM 0. It is this value that is looked at by the other scripts to determine whether a Play All function is in progress.

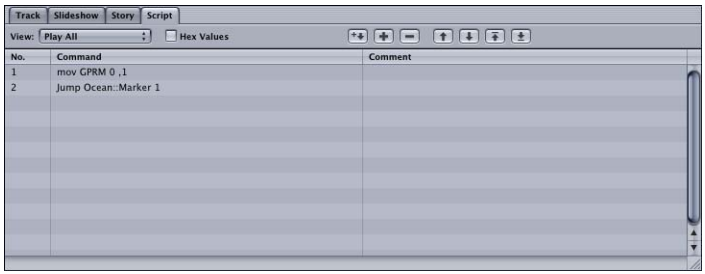
7 In the Script Editor, click the Add button.

A second command line is added to the script.

8 In the Script Command Inspector, choose Jump as the command.

9 To configure the jump command, choose Tracks and Stories > Ocean > Marker 1 from the Jump To pop-up menu.

This plays the first of the four tracks.



Note: Remember that the Ocean track is fictitious. Unless you created a track called "Ocean," you won't see it in this pop-up menu.

Link this script to the main menu's Play All button. See Setting a Button's Connection for more information.

The Track End Scripts for the First Three Tracks

The scripts you will link to the End Jump settings of the first three tracks are nearly identical—the only difference is the track name they jump to if a Play All function is in progress. The script used by the last track is a bit different, because it resets the GPRM that indicates a Play All function is in progress and always jumps to the main menu.

Follow these steps to create the script for the first track (Ocean). The notes indicate any changes you would enter for the other tracks (Beach and Trail). Remember these track names are fictitious, and you won't actually see them in the pop-up menu unless you create them.

To create the script for the first three tracks

1. Create a script and select it.
2. Enter `Ocean End` as the script's name.

   Note: Enter `Beach End` and `Trail End` as the names when creating the scripts for the other two tracks.
3. In the Script Editor, select the first command line (Nop).
4. In the Script Command Inspector, choose Jump as the command.
5. To configure the jump command, choose Tracks and Stories > Beach > Marker 1 from the Jump To pop-up menu.

   Note: Choose Tracks and Stories > Trail > Marker 1 and Tracks and Stories > Shopping > Marker 1 when creating the scripts for the other two tracks.
6. Add a compare function to the jump command to test to see if a Play All function is in process.

   a. Select the Compare Command checkbox.

   b. Choose GPRM 0 as the "Execute if" element to be compared to.

   c. Choose equal (=) as the "is" compare operation type.

   d. Choose Immediate as the "to" element type to compare.

   e. Enter 1 as the "with value."

   If GPRM 0 has a 1 in it (indicating the Play All function is in progress), this jump command occurs. If not, the script moves to the next command line.
7. In the Script Editor, click the Add button.

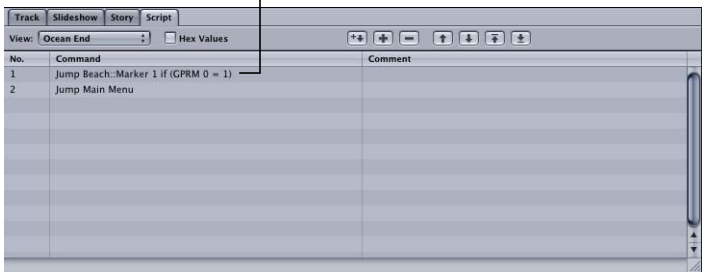
   The next command line (Nop) is added to the script.
8. In the Script Command Inspector, choose Jump as the command.

9 To configure the jump command, choose Menus > Main Menu > Button 1 from the Jump To pop-up menu.

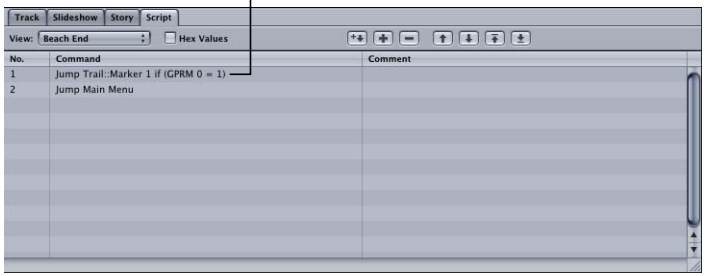
Like the track names, Button 1 is fictitious, used to illustrate the example.

This jump only occurs if the compare function was not satisfied in the previous command.

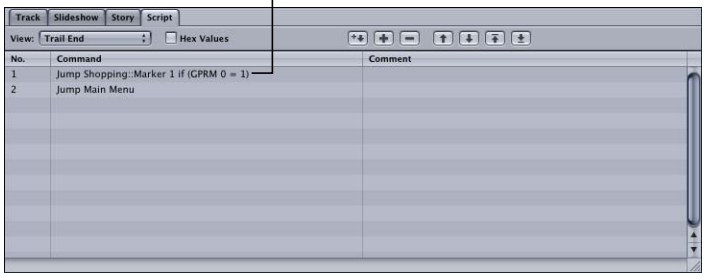
This script jumps to the Beach track once the Ocean track finishes playing.



This script jumps to the Trail track once the Beach track finishes playing.



This script jumps to the Shopping track once the Trail track finishes playing.



Once you have created all three scripts, link each to the appropriate track's End Jump setting (at the top of the Track Inspector for each track).

Track End Script for the Last Track

Follow these steps to create the script for the last track (Shopping). The main menu always appears when this track finishes playing—the difference is that the GPRM value needs to be set back to 0 so that a Play All process does not inadvertently get started later.

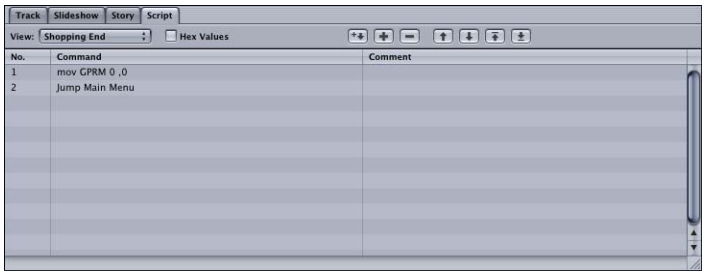
To create the Track End script for the last track

1. Create a script and select it.
2. Enter `Shopping End` as the script's name.
3. In the Script Editor, select the first command line (Nop).
4. In the Script Command Inspector, choose Set GPRM as the command.
5. To configure the set GPRM command:
   - a Choose "mov" as the Operation.
   - b Choose Immediate as the Source Type.
   - c Enter 0 as the Source Value.
   - d Choose GPRM 0 as the Target.

   The above settings place the value 0 in GPRM 0, ending the Play All process and ensuring that if you play any of the tracks individually, they will jump back to the main menu when finished playing.
6. In the Script Editor, click the Add button.

   The next command line (Nop) is added to the script.
7. In the Script Command Inspector, choose Jump as the command.
8. To configure the jump command, choose Menus > Main Menu > Button 1 from the Jump To pop-up menu.

   This script always sets GPRM 0 to 0 and jumps back to the main menu. Link this script to the Shopping track's End Jump setting, located at the top of its Track Inspector.



But What If...

When you create scripts that store a status in a GPRM, such as the Play All script, you need to plan for Viewer actions that are outside of the script's intentions. In this case, these scripts will work exactly as intended most of the time. An exception is if the viewer decides not to let the Play All process finish. The viewer might press the Menu button on the remote control while the Play All process is active and then choose a specific track to watch by selecting its button in the menu. Because the value in GPRM 0 is still "1," once that track finishes playing and runs its Track End script, it will see that GPRM 0 is "1" and jump to the next track instead of back to the menu.

In other words, the only way to really stop the Play All process and reset GPRM 0 to "0" with the previous scripts is to let the process play to the end. There are a couple of ways to handle this:

- *Force the viewer to watch to the end:* You can disable the Menu and Title buttons on the remote control. This may be appropriate for training videos with mandatory viewing. See Remote Control Settings for more information.
- *Add scripts to the other menu buttons that reset GPRM 0 to "0":* This way, if the viewer chooses to play one of the tracks on its own, the Play All process will be canceled and, once the track finishes playing, the DVD will jump back to the menu. See Canceling the Play All Script for more information.

Canceling the Play All Script

The script required to cancel the Play All script is almost identical to the Play All script—the differences are that you set GPRM 0 to "0" instead of "1," and the jump target is set to match what the button would have jumped to.

For example, if the menu with the Play All button also has buttons for each individual track ("Ocean," "Beach," "Trail," and "Shopping"), you will need to create a unique script for each of these buttons that sets GPRM 0 to "0" and then jumps to the button's track.

Use the steps in The Play All Script to create these scripts, with the following modifications:

- Name the scripts "Ocean Play," "Beach Play," and so on in step 3.
- Enter 0 as the Source Value in step 6.
- Configure the jump command in step 9 exactly as listed for the Ocean track. The scripts for the other three tracks only need this step changed, with each configured to jump their track.

Once the four scripts have been created, you link them to the menu buttons.

Language Code Table

This table lists all possible languages and their numeric equivalents. It is sorted alphabetically by the language name.

Language	Code	HEX	Decimal
(Afan) Oromo	om	6F6D	28525
Abkhazian	ab	6162	24930
Afar	aa	6161	24929
Afrikaans	af	6166	24934
Albanian	sq	7371	29553
Amharic	am	616D	24941
Arabic	ar	6172	24946
Armenian	hy	6879	26745
Assamese	as	6173	24947
Aymara	ay	6179	24953
Azerbaijani	az	617A	24954
Bashkir	ba	6261	25185
Basque	eu	6575	25973
Bengali; Bangla	bn	626E	25198
Bhutani	dz	647A	25722
Bihari	bh	6268	25192
Bislama	bi	6269	25193
Breton	br	6272	25202
Bulgarian	bg	6267	25191
Burmese	my	6D79	28025
Byelorussian	be	6265	25189
Cambodian	km	6B6D	27501
Catalan	ca	6361	25441
Chinese	zh	7A68	31336
Corsican	co	636F	25455
Croatian	hr	6872	26738
Czech	cs	6373	25459
Danish	da	6461	25697
Dutch	nl	6E6C	28268
English	en	656E	25966
Esperanto	eo	656F	25967
Estonian	et	6574	25972
Faeroese	fo	666F	26223
Fiji	fj	666A	26218

Language	Code	HEX	Decimal
Finnish	fi	6669	26217
French	fr	6672	26226
Frisian	fy	6679	26233
Galician	gl	676C	26476
Georgian	ka	6B61	27489
German	de	6465	25701
Greek	el	656C	25964
Greenlandic	kl	6B6C	27500
Guarani	gn	676E	26478
Gujarati	gu	6775	26485
Hausa	ha	6861	26721
Hebrew	iw	6977	26999
Hindi	hi	6869	26729
Hungarian	hu	6875	26741
Icelandic	is	6973	26995
Indonesian	in	696E	26990
Interlingua	ia	6961	26977
Interlingue	ie	6965	26981
Inupiak	ik	696B	26987
Irish	ga	6761	26465
Italian	it	6974	26996
Japanese	ja	6A61	27233
Javanese	jw	6A77	27255
Kannada	kn	6B6E	27502
Kashmiri	ks	6B73	27507
Kazakh	kk	6B6B	27499
Kinyarwanda	rw	7277	29303
Kirghiz	ky	6B79	27513
Kirundi	rn	726E	29294
Korean	ko	6B6F	27503
Kurdish	ku	6B75	27509
Laothian	lo	6C6F	27759
Latin	la	6C61	27745
Latvian, Lettish	lv	6C76	27766

Language	Code	HEX	Decimal
Lingala	ln	6C6E	27758
Lithuanian	lt	6C74	27764
Macedonian	mk	6D6B	28011
Malagasy	mg	6D67	28007
Malay	ms	6D73	28019
Malayalam	ml	6D6C	28012
Maltese	mt	6D74	28020
Maori	mi	6D69	28009
Marathi	mr	6D72	28018
Moldavian	mo	6D6F	28015
Mongolian	mn	6D6E	28014
Nauru	na	6E61	28257
Nepali	ne	6E65	28261
Norwegian	no	6E6F	28271
Occitan	oc	6F63	28515
Oriya	or	6F72	28530
Pashto, Pushto	ps	7073	28787
Persian	fa	6661	26209
Polish	pl	706C	28780
Portuguese	pt	7074	28788
Punjabi	pa	7061	28769
Quechua	qu	7175	29045
Rhaeto-Romance	rm	726D	29293
Romanian	ro	726F	29295
Russian	ru	7275	29301
Samoan	sm	736D	29549
Sangro	sg	7367	29543
Sanskrit	sa	7361	29537
Scots Gaelic	gd	6764	26468
Serbian	sr	7372	29554
Serbo-Croatian	sh	7368	29544
Sesotho	st	7374	29556
Setswana	tn	746E	29806
Shona	sn	736E	29550

Language	Code	HEX	Decimal
Sindhi	sd	7364	29540
Singhalese	si	7369	29545
Siswati	ss	7373	29555
Slovak	sk	736B	29547
Slovenian	sl	736C	29548
Somali	so	736F	29551
Spanish	es	6573	25971
Sundanese	su	7375	29557
Swahili	sw	7377	29559
Swedish	sv	7376	29558
Tagalog	tl	746C	29804
Tajik	tg	7467	29799
Tamil	ta	7461	29793
Tatar	tt	7474	29812
Tegulu	te	7465	29797
Thai	th	7468	29800
Tibetan	bo	626F	25199
Tigrinya	ti	7469	29801
Tonga	to	746F	29807
Tsonga	ts	7473	29811
Turkish	tr	7472	29810
Turkmen	tk	746B	29803
Twi	tw	7477	29815
Ukrainian	uk	756B	30059
Urdu	ur	7572	30066
Uzbek	uz	757A	30074
Vietnamese	vi	7669	30313
Volapuk	vo	766F	30319
Welsh	cy	6379	25465
Wolof	wo	776F	30575
Xhosa	xh	7868	30824
Yiddish	ji	6A69	27241
Yoruba	yo	796F	31087
Zulu	zu	7A75	31349

Establishing Connections

21

Your DVD title is a collection of elements you want your audience to view. The way you set the connections between these elements determines the way the viewer experiences your DVD title. You can use the Connections tab to determine how the viewer moves from one element to another. You make links so the viewer jumps from a starting point, or *source*, to a destination, or *target*.

This chapter covers the following:

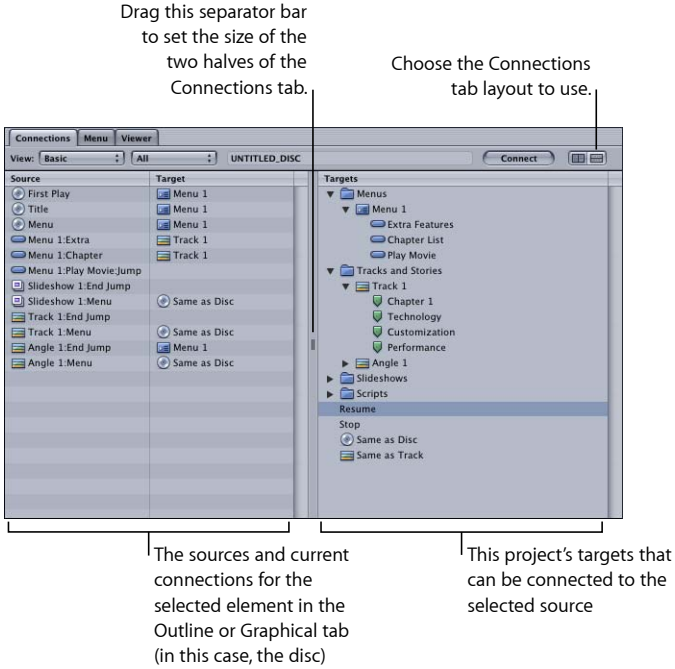
- About Connections (p. 531)
- Connections Tab (p. 532)
- Connection Items (p. 533)
- Making Connections (p. 537)
- Connection Details (p. 540)
- Source Details (p. 540)
- Target Details (p. 547)

About Connections

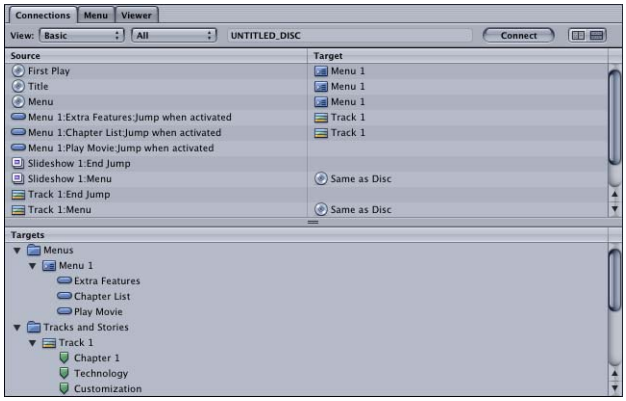
There are a number of places within DVD Studio Pro where you can establish connections between a project's elements. Some are in Inspectors and some are in shortcut menus. Some connections are automatically set when you import an asset directly to a menu or track. The Connections tab provides a way to view and set all connections for a selected element, such as a menu or track, at the same time. You can also use the Connections tab to verify that you have not inadvertently left an item without a connection.

Connections Tab

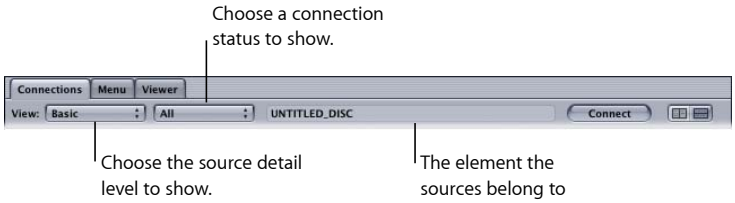
Connections are listed in two sections in the Connections tab. The sources (the elements' starting points) and their current connections are on the left and the targets (the destinations) are on the right.



You can also display the two halves of the Connections tab with the sources on the top and the targets on the bottom by either clicking the buttons in the upper-right corner or pressing the Control key and clicking the separator bar.



The pop-up menus along the top of the Connections tab allow you to choose the detail level of the sources and whether to view only sources that do or do not have a connection assigned.



Connection Items

There are three items involved in making a connection:

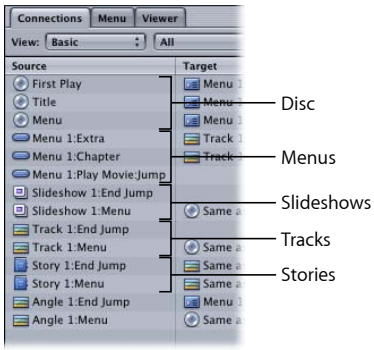
- The project *element* that is the subject of the connection. This can be a menu, track, slideshow, or the disc in general. The contents of the Connections tab change to match those that apply to the currently selected element. See Project Elements for more information.
- The *source* to be connected from. Every menu, track, slideshow, and disc has sources that you can link from. The more complicated the element, the more sources it will have (a menu with 12 buttons will have more source connections than a menu with 4 buttons). See Sources for more information.
- The *target* to be connected to. Targets include all possible connections for all elements within your project. Most targets are available to each source. While a source can only connect to one target, a target can be used by multiple sources. See Targets for more information.

Project Elements

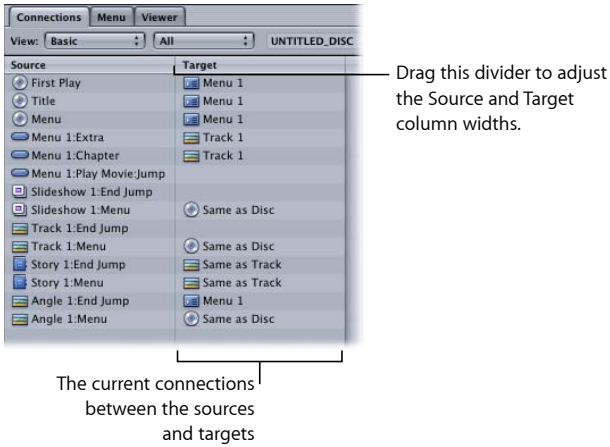
The project element you select in the Outline or Graphical tab determines the list of sources displayed in the Connections tab. Selecting the disc displays all sources from all elements, plus a few sources that do not appear in any of the other elements.

Sources

Sources fall into five categories: the disc, menus, tracks, stories, and slideshows. The number of choices you see in the list of sources depends on the selected element and whether you have chosen Basic, Standard, or Advanced from the View pop-up menu above the source list.



The right half of the source list shows the current connections.



- *Basic:* The most fundamental jumps you can make are in the basic list of sources. These include the startup action for the disc and the jumps made when the viewer presses the Title and Menu buttons on the remote control when the disc is inserted in the player. The basic link for menus is where to jump when buttons are activated. The basic links for tracks and slideshows are where to jump when playback is finished and where to jump when the Menu button is selected while the track or slideshow is playing.

- *Standard:* The most commonly used jumps are found in the standard list of sources. In addition to those in the basic list, pre-scripts (scripts designed to run when the element is chosen) are listed for menus, tracks, and slideshows. If a DVD menu has been on the screen for a period of time specified in the General tab in the Menu Inspector, the subsequent action is determined by the Menu Timeout Target link. Each marker in a track and each slide in a slideshow displays its own end jump and menu button links.
- *Advanced:* The advanced list of sources contains all of the possible sources available for the selected element. In addition to the basic and standard sources, the Return button on the DVD player's remote control is also listed.

Additionally, for tracks and slideshows you can set connections for the following buttons found on some remote control devices: Audio, Subtitle, Angle, and Chapter menu buttons. These links can make it convenient for viewers to access DVD menus that allow them to select audio and subtitle options, an angle, or a chapter. However, be sure to design your title with other ways to reach these DVD menus because very few remote controls offer these buttons.

Important: It is important not to confuse these buttons with the Audio, Subtitle, and Angle selection buttons commonly found on remote controls—these buttons do not access a menu and instead directly change the selected stream.

See Source Details for a complete list of sources as well as methods (other than the Connections tab) that you can use to link them.

Next Jump and Prev Jump

Tracks and slideshows have two settings, Next and Previous Jump, that can only be set in the Connections tab with the advanced sources displayed. These settings define what happens when the viewer presses the Next and Previous buttons on the DVD player's remote control.

While a track or slideshow is playing, the Next and Previous buttons allow the viewer to skip forward or backward between markers or stills. A setting in the Connections tab defines what happens if the viewer presses the Next or Previous button when there is no next or previous marker or slide. By default, with nothing assigned to these settings, nothing happens. This is the normal action used for most projects.

If you establish a connection to either of these buttons, there are two issues that you must be aware of:

- You will no longer be able to set the Menu button action for each marker—you will only be able to set it for the first marker.
- The DVD player will no longer display a play time for the track or slideshow.

See Setting a Pause on the Last Slide for information on using the Next Jump setting in a slideshow.

Targets

The list of targets includes all menus and their buttons, all tracks and their stories and markers, all slideshow stills, and all scripts. There are four additional commands that can appear at the top of the list, depending on the selected source: Resume, Stop, Same as Disc, and Same as Track.

See Target Details for a complete list of targets.

Default Connections

There are two types of connections that DVD Studio Pro makes automatically: linking each marker in a track to the next marker, and assigning the same menu button action to all of a track's markers. These connections are not shown in the Connections tab and can be overridden by assigning different targets while in the Standard or Advanced source view.

Chapter-to-Chapter Connections

DVD Studio Pro automatically links the end jump from one marker to the beginning of the next marker. This allows a track to play seamlessly through the markers. The end jump for the last marker is not linked to any targets—you must set this yourself using the End Jump setting.

Setting Chapter Marker End Jumps

In addition to the limit of 99 chapter markers per track, DVD Studio Pro has a combined limit of 106 chapter markers and individual chapter end jump settings per track. This is normally not an issue except in special cases where you decide to set an end jump for each chapter marker.

If your track has 54 chapter markers, each configured with an end jump, the result is a combined 108 markers and jump settings. This will cause an error message to appear when you build the project. Because setting end jumps on chapter markers prevents the track from playing seamlessly from start to end, you can instead divide the track into two tracks, each containing a portion of the markers and thus avoid the 106 limit.

For example, you might use chapter markers with end jumps set to "edit" a track into multiple small clips. If you configure a menu button to jump to a specific chapter marker, the track starts playing from that point. Once the next marker is reached, the end jump directs the DVD player back to the menu, resulting in only a small portion of the track playing.

The advantage of this is that you can easily configure a track to play as short clips and not worry about running into the 99 tracks, stories, and slideshows per project limit. The disadvantage of this is that you cannot play the track from start to end—as soon as the first marker that has its end jump set is reached, the player jumps to that setting.

You can accomplish a similar result by creating a story that plays only from one chapter marker to the next. The disadvantage of doing this is that if you have a lot of these that you want to configure, you will quickly run into the 99 tracks, stories, and slideshows per project limit.

Menu Button Connections

Once you establish a connection to the Menu button of the DVD player's remote control, it is automatically applied to all markers in the track.

Making Connections

Making connections involves displaying the correct sources and then linking them to the targets. While the Connections tab provides a complete list of all possible connections between your project's elements, many of these connections can also be configured using other methods.

Connections can be made in a number of Inspectors, including those for menus, buttons, tracks, slideshows, and the disc. For example, in the Button Inspector, you can set the target for a button. Additionally, you can set connections to buttons in the Menu and Subtitle Editors.

See Source Details for a complete list of all sources and their alternative linking methods. See Target Details for a complete list of all targets.

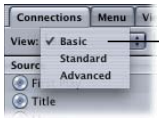
Changing the Displayed Sources

There are three groups of sources you can see in the source list: basic, standard, and advanced. The most fundamental jumps for the selected element are shown in Basic source view. The most commonly used jumps are shown in the Standard source list. The Advanced list shows all possible jumps for the selected element.

To change the sources displayed

1 Select the element you want to work with in the Outline or Graphical tab. For a global view of all the sources, select the disc in the Outline tab, or click an empty area in the Graphical tab.

2 Choose Basic, Standard, or Advanced from the View pop-up menu located just above the source list.



Choose which sources are shown.

You can also display all sources, only sources with connections, or only sources without connections, using the second View pop-up menu.

Use each source's connection status to choose which sources to display.

Establishing Connections in the Connections Tab

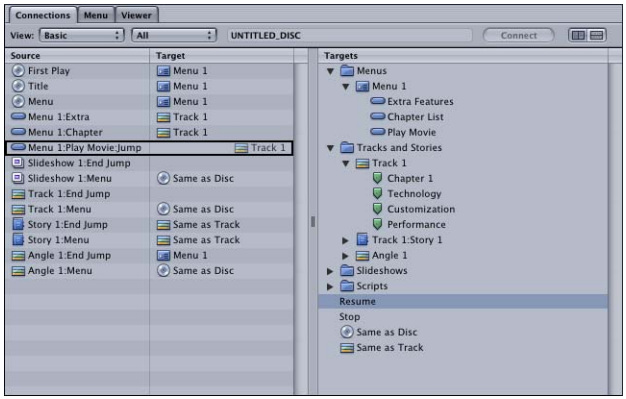
There are several methods you can use to establish connections in the Connections tab: dragging targets to the sources, using shortcut menus, and using keyboard shortcuts.

To establish a connection in the Connections tab

1 Determine the source to which you want to assign a target.

2 Do one of the following:

- Locate the item you want to link to in the Targets column on the right, and drag it to the source on the left. A black box surrounds the selected source, making it clear that you are linking to the correct one.



If you drag a target that is not supported by the source, the black box does not appear.

- Hold down the Control key and click in the Target column next to the source for which you want to create a link. Choose a target from the shortcut menu.

- Click to select a source and a target, then click the Connect button at the top of the Connections tab.

You can change an existing connection using these same methods.

To establish connections using keyboard shortcuts

1 Press the Up Arrow and Down Arrow keys to scroll through the currently active list (sources or targets) until you select the element you want to connect.

2 Press the Control key while using the Up Arrow and Down Arrow keys to scroll through the other list until you highlight the entry you want to connect.

3 Press Return to make the connection.

If you select a source that already has a connection, pressing Return disconnects it. You can also press the Option key while using the Up Arrow and Down Arrow keys to jump to the top or bottom of the list.

If you want to connect to an element in the Targets list, you need to already have its disclosure triangle set to show the element's contents.

To delete a connection

1 Press the Up Arrow and Down Arrow keys to scroll through the currently active list (sources or targets) until you select the element you want to connect.

2 Press the Delete key.

Connection Details

Many of the sources and targets are intuitive in their usage. However, some are not often used or can cause unexpected issues with your title.

Note: The actual sources and targets you see depend on the elements in your project. The names used in the following descriptions, Basic, Standard, and Advanced, are assigned by default when the elements are created.

Source Details

The sources displayed depend on which group of sources you choose—basic, standard, or advanced. The last two groups contain the sources from the previous level or levels, plus additional ones.

The primary method of setting connections for all sources is to use the Connections tab. Alternative methods are given in the far-right column below.

Basic

The following sources are available when viewing the basic source group. All these sources should be linked before you build the title.

Disc Sources

Following are the disc-level basic sources.

Source	Usage	Alternative methods
First Play	Use to specify what is displayed when the disc first starts playing after being inserted into the DVD player (automatically set to Menu 1).	First Play in the Disc Inspector. Control-click disc in Outline tab. Control-click empty area in Graphical tab.
Title	Use to specify the action when the viewer presses the Title button on the DVD player's remote control.	Disc Inspector General tab

Source	Usage	Alternative methods
Menu	Use to specify the action when the viewer presses the Menu button on the DVD player's remote control. This setting can be overridden by similar settings in tracks, markers, stories, and slideshows.	Disc Inspector General tab

Menu Sources

Following is the menu-level basic source.

Source	Usage	Alternative methods
Button1:Jump when activated	Use to specify the action when the button is activated.	Button Inspector. Control-click button in the Menu Editor. Drag element directly to button.

Track Sources

Following are the track-level basic sources.

Source	Usage	Alternative methods
End Jump	Use to specify the action when the track reaches its end during playback.	End Jump in the Track Inspector (automatically set in some cases)
Menu	Use to specify the action when the viewer presses the Menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Track Inspector General tab
Marker 1:Button 1:Jump when activated	Use to specify the action when the button (part of a subtitle stream) is activated.	Subtitle Inspector Button tab Control-click button in the Subtitle Editor.

Story Sources

Following are the story-level basic sources.

Source	Usage	Alternative methods
End Jump	Use to specify the action when the story reaches its end during playback. By default, this is set to Same as Track.	End Jump in the Story Inspector (automatically set to Same as Track)

Source	Usage	Alternative methods
Menu	Use to specify the action when the viewer presses the Menu button on the DVD player's remote control. This setting overrides the disc and track settings. By default, this is set to Same as Track.	Story Inspector General tab (automatically set to Same as Track)

Slideshow Sources

Following are the slideshow-level basic sources.

Source	Usage	Alternative methods
End Jump	Use to specify the action when the slideshow reaches its end during playback.	End Jump in the Slideshow Inspector (automatically set in some cases)
Menu	Use to specify the action when the viewer presses the Menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Slideshow Inspector General tab

Standard

The following sources are available when viewing the standard source group. These sources are in addition to those available at the basic level.

Menu Sources

Following are the menu-level standard sources in addition to the basic sources.

Source	Usage	Alternative methods
Pre-Script	Use to assign a script to be run prior to displaying this menu.	Menu Inspector Menu tab
Menu Timeout Target	Use to specify the action when the menu's inactivity timeout setting expires.	Menu Inspector General tab

Track Sources

Following are the track-level standard sources in addition to the basic sources.

Source	Usage	Alternative methods
Pre-Script	Use to assign a script to be run prior to playing this track.	Track Inspector General tab

Source	Usage	Alternative methods
Marker 1:Menu	Use to specify the action when the viewer presses the Menu button on the DVD player's remote control. This setting overrides the disc and track settings.	Marker Inspector General tab
Marker 1:End Jump	Use to specify the action when the marker's part of the track finishes playing (the frame before reaching the next marker).	End Jump in the Marker Inspector

Story Sources

Following are the story-level standard sources in addition to the basic sources.

Source	Usage	Alternative methods
Pre-Script Target	Use to assign a script to be run prior to playing this story.	Story Inspector General tab
Marker 1 Entry:End Jump	Use to specify the action when this entry marker's part of the track finishes playing (the frame before reaching the next marker).	Story Marker Inspector
Marker 1 Entry:Menu	Use to specify the action when the viewer presses the Menu button on the DVD player's remote control. This setting overrides the disc and track settings.	Story Marker Inspector

Advanced

The following sources are available when viewing the advanced source group. These sources are in addition to those available with the basic and standard levels.

Disc Sources

Following are the disc-level standard sources in addition to the basic and standard sources.

Source	Usage	Alternative methods
Angle	Use to specify the action when the viewer presses the Angle menu button on the DVD player's remote control. This setting can be overridden by similar settings in tracks and slideshows.	Disc Inspector Advanced tab

Source	Usage	Alternative methods
Chapter	Use to specify the action when the viewer presses the button on the DVD player's remote control. This setting can be overridden by similar settings in tracks and slideshows.	Disc Inspector Advanced tab
Audio	Use to specify the action when the viewer presses the Audio menu button on the DVD player's remote control. This setting can be overridden by similar settings in tracks and slideshows.	Disc Inspector Advanced tab
Subtitle	Use to specify the action when the viewer presses the Subtitle menu button on the DVD player's remote control. This setting can be overridden by similar settings in tracks and slideshows.	Disc Inspector Advanced tab
Return	Use to specify the action when the viewer presses the Return button on the DVD player's remote control. This setting can be overridden by a similar setting in menus.	Disc Inspector General tab

Menu Sources

Following is the menu-level standard source added to the basic and standard sources.

Source	Usage	Alternative methods
Return	Use to specify the action when the viewer presses the Return button on the DVD player's remote control. This setting overrides the disc setting.	Menu Inspector Menu tab

Track Sources

Following are the track-level standard sources in addition to the basic and standard sources.

Source	Usage	Alternative methods
Angle	Use to specify the action when the viewer presses the Angle menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Track Inspector General tab (automatically set to Same as Disc)
Chapter	Use to specify the action when the viewer presses the Chapter menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Track Inspector General tab (automatically set to Same as Disc)
Audio	Use to specify the action when the viewer presses the Audio menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Track Inspector General tab (automatically set to Same as Disc)
Subtitle	Use to specify the action when the viewer presses the Subtitle menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Track Inspector General tab (automatically set to Same as Disc)
Chapter	Use to specify the action when the viewer presses the Chapter menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Track Inspector General tab (automatically set to Same as Disc)
Next Jump	Use to specify the action when the viewer presses the Next button on the DVD player's remote control after the last marker. See Next Jump and Prev Jump for more information.	None
Prev Jump	Use to specify the action when the viewer presses the Previous button on the DVD player's remote control before the first marker. See Next Jump and Prev Jump for more information.	None

Slideshow Sources

Following are the slideshow-level standard sources in addition to the basic and standard sources.

Source	Usage	Alternative methods
Angle	Use to specify the action when the viewer presses the Angle menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Slideshow Inspector (automatically set to Same as Disc)
Audio	Use to specify the action when the viewer presses the Audio menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Slideshow Inspector (automatically set to Same as Disc)
Subtitle	Use to specify the action when the viewer presses the Subtitle menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Slideshow Inspector (automatically set to Same as Disc)
Chapter	Use to specify the action when the viewer presses the Chapter menu button on the DVD player's remote control. This setting overrides the disc setting. By default, this is set to Same as Disc.	Slideshow Inspector (automatically set to Same as Disc)
Next Jump	Use to specify the action when the viewer presses the Next button on the DVD player's remote control during the last slide. See Next Jump and Prev Jump for more information.	None
Prev Jump	Use to specify the action when the viewer presses the Previous button on the DVD player's remote control during the first slide. See Next Jump and Prev Jump for more information.	None

Target Details

The list of targets is the same for all sources. Some targets only work with specific source types; DVD Studio Pro only allows you to assign appropriate targets to the sources.

- *Menus:* Use to select the menu to link to a source. Select the menu to have the menu appear with the default buttons highlighted and to have the pre-script (if assigned) execute, or select a specific button to have the menu appear with that button highlighted.
- *Tracks and Stories:* Use to select the track or story to link to a source. Select the track or story to have it play from the beginning and to have the pre-script (if assigned) execute, or select a specific marker or story entry to link to a specific place in the track or story.
- *Slideshows:* Use to select a slideshow to link to a source. Select the slideshow to have it play from the beginning and to have the pre-script (if assigned) execute, or select a slide to link to.
- *Scripts:* Use to select a script to link to a source.

  Note: The following only appear when a suitable source is selected.

- *Resume:* Can only be assigned to menu buttons. Use it to take viewers from a menu back to a specific point in a track. For example, you can set up a track's marker to jump to a menu that provides information or a graphic that pertains to the track just jumped from. The menu can have a single button set to Resume that, when activated, takes viewers back to the track at the point they left off.
- *Stop:* Can only be assigned to the End Jump settings of markers and slides. Use it to force the DVD player to stop playing once the marker or slide is reached.
- *Same as Disc:* Can only be assigned to sources that define actions for remote control buttons (such as Menu or Audio). Use it to set a remote control button to act the same as the disc's setting.
- *Same as Track:* Can only be assigned to story sources that define actions for remote control buttons. Use it to set a remote control button to act the same as the track's setting.

Finishing a Project

22

Once you have created your project's tracks, stories, slideshows, and menus, and set the connections between them, you are ready to take the final steps to create the DVD.

This chapter covers the following:

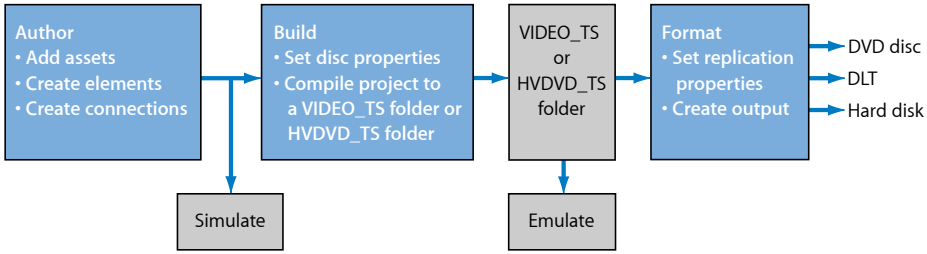
- About the Final Steps of DVD Creation (p. 549)
- Should You Burn, Build, Format, or Build and Format? (p. 550)
- Options for Testing Your Project (p. 552)
- Simulating Your Project (p. 552)
- Setting Disc Properties (p. 559)
- Building Your Project (p. 566)
- Emulating Your Project Using DVD Player (p. 575)
- Setting Disc Format Properties (p. 577)
- About DVD-ROM Discs (p. 577)
- About Dual-Layer Discs (p. 580)
- About Two-Sided Discs (p. 584)
- Formatting Your Project (p. 584)
- Reading a DLT Drive (p. 590)

About the Final Steps of DVD Creation

Following is a list of the final steps in the DVD creation process:

- *Testing your project with the Simulator:* Using the Simulator allows you to verify most of your connections and button navigation before building the title.
- *Setting prebuild disc properties:* This is the time to set any last-minute disc properties, especially those that must be set before you build the title.
- *Building your project:* This process creates a VIDEO_TS (video zone for SD projects) or HVDVD_TS (for HD projects) folder and compiles your project's elements into a DVD-compliant file structure.

- *Emulating your project:* You can use the Apple DVD Player to play the VIDEO_TS or HVDVD_TS folder's contents.
- *Setting preformat properties:* You can set various details, such as copy protection, region coding, and various disc media attributes.
- *Formatting your project:* In this step, the VIDEO_TS and/or HVDVD_TS folder and any other added DVD-ROM content are formatted and written to the selected output type.



Should You Burn, Build, Format, or Build and Format?

When your project is finished, you have the option of directly burning a DVD or stepping through the process of building and formatting the project. The option you use depends on your situation.

Burning a Project

Burning is a simple one-click step that creates a DVD from your project. You simply click Burn in the toolbar or press Command-Option-B to start the process. Your system's DVD burning drive is checked to see if suitable recordable media is present—if not, a dialog appears, prompting you to insert a blank disc. And that's it. The process starts and there are no more decisions to make. This is a good choice if you do not require special settings, such as selecting the drive to write to.

Burning a project creates a VIDEO_TS or HVDVD_TS folder just as with the build process. It is written to the location specified in the Destinations pane in DVD Studio Pro Preferences. This makes it possible to burn additional discs (using Format) without needing to recreate the VIDEO_TS or HVDVD_TS folder.

If your system has multiple drives that can burn DVDs, the burn process uses the first general type drive it finds. If none are found, it then looks for an authoring drive. You cannot use the burn process to write to a DLT or disk image.

If you want to make several DVDs of your project, you can use Burn to create the first disc, and then save time by using Format to create the additional DVDs. This avoids having DVD Studio Pro recreate the VIDEO_TS or HVDVD_TS folder for each disc.

Building a Project

The build process only creates the VIDEO_TS or HVDVD_TS folder; it does not burn a disc. You click Build in the toolbar or press Command-Option-C to start the process.

With the build process, you are able to choose the location where the VIDEO_TS or HVDVD_TS folder is created. Using Build by itself is useful when you want to create the VIDEO_TS or HVDVD_TS folder so that you can emulate the project using DVD Player, or if you want to manually copy the VIDEO_TS or HVDVD_TS folder to a disc.

See Building Your Project for more information.

Formatting a Project

The format process requires you to have a VIDEO_TS and/or HVDVD_TS folder already created. You click Format in the toolbar or press Command-F to start the process. Using Format is especially useful when you want to make multiple discs from the same VIDEO_TS or HVDVD_TS folder.

You would usually use the format process after you had emulated the VIDEO_TS or HVDVD_TS folder and were ready to burn a disc or DLT. You can also combine the format process and the build process (described next); however, an advantage to using the format process separate from the build process is that you can choose the VIDEO_TS or HVDVD_TS folder to format. This can be useful if you are working on a new project and get a request for a DVD of an earlier project whose VIDEO_TS or HVDVD_TS folder is still available.

See Setting Disc Format Properties for more information.

Building and Formatting a Project

When combined, the build and format processes act similarly to the burn process. The difference is that you are presented with the same configuration options you get when you use the build and format processes separately, which allows you to customize the process. You click Build/Format in the toolbar or press Command-Option-F to start the process.

After you configure the build and format options, you are then not required to do anything more until the DVD or DLT has been created. An exception is dual-layer discs, because the break point cannot be verified until the VIDEO_TS or HVDVD_TS folder has been created.

See About the Build/Format Command for more information.

Options for Testing Your Project

There are three methods you can use to test your project: using the DVD Studio Pro preview and simulation features, and playing the title on a DVD player (emulating your project).

- *Previewing your project's elements:* The DVD Studio Pro preview feature provides a way to view single elements, such as a track. Preview does not allow you to check how one element works with others in the project. For example, you cannot use it to verify a connection from a menu to a track. See Viewing a Track and Previewing a Slideshow for more information.
- *Simulating your project:* The DVD Studio Pro simulation feature is a relatively comprehensive way to test most aspects of a project, with the primary focus on verifying connections. The Simulator works a lot like a DVD player that plays the project before it's built into a video title set. It allows you to test most connections, including First Play, and provides the functions of a DVD player remote control. It also provides a complete display of the contents of the System Parameter Register Memories (SPRMs) and General Purpose Register Memories (GPRMs), making it possible to verify many scripts.

  You can also configure your system to simulate the project using an external video and audio monitor. This makes it possible to see the project as most viewers will, with actual pixel aspect ratios, colors, and if applicable, interlacing. See Simulating Your Project for more information.
- *Emulating your project:* Emulating your project by playing it on a real DVD player is the most sure test of it. To emulate your project with the Apple DVD Player, you must build the VIDEO_TS or HVDVD_TS folder. To emulate your project using a standalone DVD player, you must also format it and burn a disc that you can then play on any DVD player. It's important to test your project under varying conditions, especially if your project relies heavily on scripts. See Emulating Your Project Using DVD Player for more information.

Simulating Your Project

The DVD Studio Pro Simulator is a useful tool for verifying your project while you are still creating it. There are a few things to be aware of before simulating your project:

- The Simulator behaves much as a standalone DVD player. This means you should have the links set to allow you to navigate around the project. In particular, be sure to set your First Play action to a suitable menu or track. If you do not yet have the assets that will be the actual First Play element, you can temporarily link to an interim menu instead. This ensures that an element is displayed if you start the Simulator by clicking Simulate in the toolbar.

There are also a variety of ways you can force the Simulator to start at a specific element. For example, you can Control-click the element in the Outline or Graphical tab, then choose Simulate from the shortcut menu. This allows you to test parts of the project without having all of the elements in place.

- DVD Studio Pro Preferences contains a number of settings in the Simulator pane that allow you to configure the Simulator much like you would a DVD player. For example, you can set the Simulator's region code, aspect ratios, language preferences, and playback output options to test for different situations. See Simulator Preferences for more information.
- Because the project has not been built yet, the Simulator must use assets as and where they are. This may lead to issues with playback, such as stuttering or pauses. The severity of these issues depends on the assets and the computer you are authoring on.
- The Log tab contains a simulation log that provides information on a simulation while it is in progress. This information can be useful when you are trying to work out issues with your project.
- The Simulator processes Pause After VOBU settings on markers set at slides in a track. The Simulator does not process Pause After VOBU settings on markers set on full-motion video clips (which it is not recommended to do in any case). The track plays as if the settings were not active. See General Tab in the Marker Inspector for more information on VOBUs.

Simulating with an External Video and Audio Monitor

When you author a DVD, it can be important to see the video and hear the audio with devices that closely match those that the viewer is expected to use. Being able to do this while simulating your project allows you to verify the video and audio prior to burning a test DVD. In particular:

- You see the true color based on the DVD specification's YUV values instead of a computer monitor's RGB values.
- You see the actual pixel aspect ratios. To display 4:3 or 16:9 video on a computer monitor requires the pixels to be scaled, which can create or hide issues in the video.

See External Video and Audio Monitoring for information on connecting external monitors. See Simulator Preferences for information on Simulator settings.

When using an external video monitor, keep the following in mind:

- The external video monitor is only used during simulation.
- When using an external video monitor, the Simulator window on your computer is inactive.
- You cannot use the pointer to click buttons on the external monitor. You must control the simulation by using the Simulator window's controls.

- Depending on your system and the video being simulated, frames may be skipped during playback to maintain synchronized playback with the audio.

Starting and Stopping the Simulator

You can start the Simulator at any time while creating your project. You should have sufficient connections set so that navigation is possible between the elements you want to test. The most important item to have set is the First Play action. If you select the disc in the Outline tab or click an empty area in the Graphical tab, you can set the First Play action in the Connections tab or in the Disc Inspector. You can also set the First Play action directly in the Outline and Graphical tabs. See Assigning the First Play Element for more information.

To start and stop the Simulator from the First Play element

Do one of the following:

- Click the disc item in the Outline tab, then choose File > Simulate Disc, or press Command-Option-0 (zero).
- Control-click the Graphical tab's background, then choose Simulate Disc from the shortcut menu.
- Click Simulate in the toolbar.

The Simulator opens and displays the First Play element. An alert appears if none has been assigned, and the Simulator starts at the first video stream of the first track.

Stop the simulation by clicking the close button in the upper-left corner of the window or pressing Command-W.

You can also start the Simulator from a specific element or part of an element, including tracks, stories and story entries, slideshows and specific slides, or menus and specific buttons. This is useful when you only want to verify a specific element without going through the normal project navigation to get to it.

To start the Simulator from a specific element

Do one of the following:

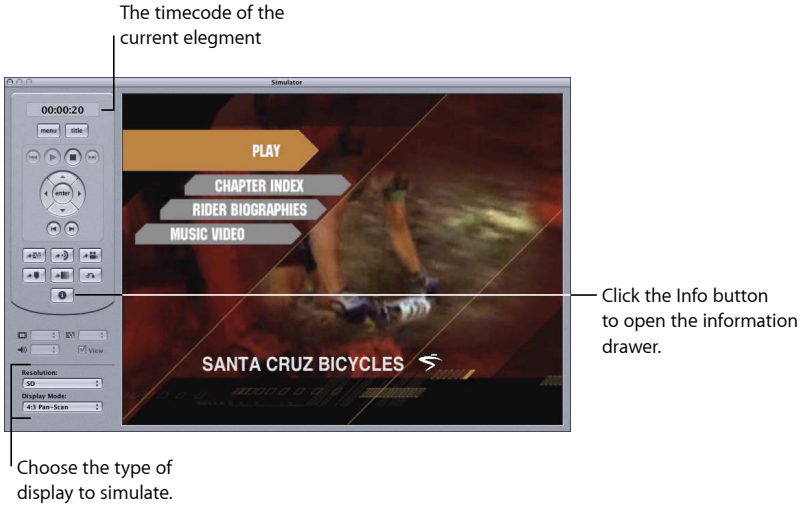
- Choose File > Simulate, or press Command-Option-0 (zero). (If no element is selected, the Simulator starts from the First Play element.)
- Control-click the element in the Outline or Graphical tab, then choose Simulate from the shortcut menu.
- Control-click in the element's editor, then choose Simulate from the shortcut menu.

The Simulator opens and displays the element.

Note: If the element you start the Simulator at has a pre-script assigned to it, the pre-script is not executed.

Simulator Window

The Simulator window appears in front of all other DVD Studio Pro windows.



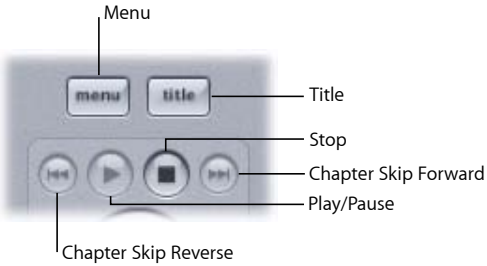
The area to the left of the video display contains the playback controls you can use to navigate within your project. Most are similar to controls you would find on a DVD player's remote control. You can click the Info button to open a drawer that shows information about the currently displayed element and the settings within the SPRMs and GPRMs.

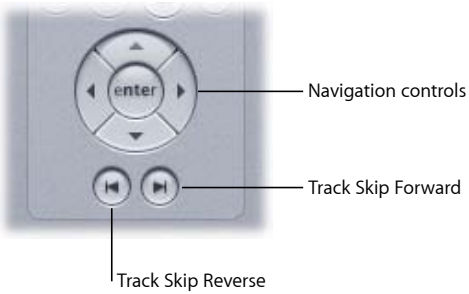
You are also able to choose the resolution (SD, HD 720, or HD1080) and the display mode (4:3 Pan-Scan, 4:3 Letterbox, or 16:9) to simulate when not using an external video monitor.

Note: You can set the default state of these in the Simulator pane of DVD Studio Pro Preferences.

Playback Controls

The playback controls are similar to those found on DVD player remote controls.

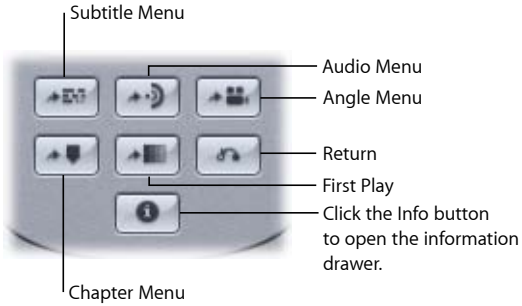




- *Menu:* Jumps to the element assigned to the Menu button. The assignment can be different for each track, story, marker, and slideshow.
- *Title:* Jumps to the element assigned to the Title button.
- *Play/Pause:* Alternately pauses, then plays the track or motion menu.
- *Stop:* Stops playback of the project. The jacket picture appears if you have assigned one to your project. See About Jacket Pictures for more information. Click First Play to restart playback.
- *Track Skip Reverse and Track Skip Forward:* To the left and right of the Play/Pause button and Stop button, these buttons skip to the beginning or end of a track, allowing you to test pre-scripts, display conditions, and End Jump settings.
- *Navigation controls:* Allow you to navigate through the menus as you would with the arrow buttons on a remote control. (You can also use the pointer and click the menu buttons directly.) Press the center button to activate the currently selected button.
- *Chapter Skip Reverse and Chapter Skip Forward:* Skip to the previous or next chapter marker or still while playing a track or slideshow.

Menu Controls

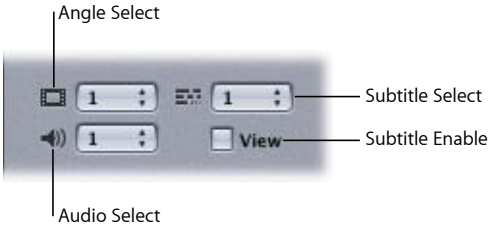
The menu controls let you test the project's remote assignments.



- *Chapter Menu, Angle Menu, Audio Menu, and Subtitle Menu:* Jump to the element assigned to the Chapter, Angle, Audio, and Subtitle menu buttons (not to be confused with the Angle, Audio, and Subtitle stream select buttons). The assignment can be different for each track and slideshow.
- *First Play:* Restarts playback of the project by executing the First Play action.
- *Return:* Jumps to the element assigned to the Return button. The assignment can be different for each menu.

Stream Selections

The stream selection pop-up menus operate like the Angle, Audio, and Subtitle buttons found on most remote controls.



- *Angle Select, Audio Select, and Subtitle Select:* When playing a track with multiple streams, you can choose the streams to play. Each pop-up menu shows the stream number currently playing. To change streams, open the pop-up menus and choose a new stream.
- *View checkbox:* Controls whether the selected subtitle stream displays. Select the checkbox to show subtitles and deselect it to hide them.

Information Drawer

You can click the Info button or press Shift-I to open the information drawer. The drawer can open on any side of the Simulator, depending on the Simulator's position. (You can press Shift-Option-I to have it open on a different edge.) The information drawer changes to match the current element type (menu, track, story, and so on). The Item Properties section shows information specific to that element; you cannot enter information into it. The Registers section shows the status of either the SPRMs or GPRMs. You can choose which to see by selecting the relevant checkbox. You can also choose to see the values in hexadecimal. You can double-click a value to enter a new value into it if you want to verify how your project operates under specific DVD player conditions. You can also enter a new name for any of the GPRMs.

Simulation Log

The Log tab contains a Simulate view that provides details of a simulation while it is running. These details include any changes in the SPRMs and GPRMs, any navigation actions, and any jumps that are made.

To show the simulation log

1 Click the Log tab.

2 Choose Simulate from the View pop-up menu.

3 Simulate the project.

Note: The Log tab automatically appears once you start the Simulator.

Setting Disc Properties

The Disc Inspector contains settings that affect your DVD title. Some settings, such as the disc's name, its First Play action, and the video standard, can be set early in the project creation process. You do not have to make other settings until you are ready to burn a DVD, write to a Digital Linear Tape (DLT) drive, or write to a hard disk.

The top of the Disc Inspector and its General and Advanced tabs contain settings that affect the title's playback. All of these settings (except the disc name and DVD-ROM settings) must be set before you build your project. You must also set the Macrovision setting in the Region/Copyright tab.

The remaining settings affect the format process. You can set them at any time, even after you start the format process.

To open the Disc Inspector

- Select the disc's name in the Outline tab or click an empty area in the Graphical tab.

Settings at the Top of the Disc Inspector

There are three settings at the top of the Disc Inspector.

- *Name:* This is the name that appears when the DVD is played on a computer. It's also the name that appears in the Outline tab. The default name is Untitled Disc. You can enter a name with a maximum of 32 characters. While you can enter any characters you wish, the only permissible characters for the formatted disk image are the 26 uppercase English characters, numerals 0 through 9, and the underscore ("_"). DVD Studio Pro automatically converts lowercase letters to uppercase and removes unsupported characters when you use the format feature.

  The disc name does not need to be set before building the project. You can set it during the formatting process.

- *Est. Size:* This displays the amount of disc space that DVD Studio Pro estimates will be required for the build, including any DVD-ROM files you may be adding. This size uses the same convention as used by DVD media—one MB is equal to 1,000,000 bytes. See Making Sure Your Content Will Fit for information on how much data a 4.7 GB disc can actually hold.

- *First Play:* This specifies what appears when the disc is first inserted into a DVD player. First Play can also be set in the Connections, Outline, and Graphical tabs. It is important to set First Play prior to building the project to ensure that all DVD players will play the disc correctly. You can choose from all menus, tracks, stories, slideshows, and scripts within your project.

See Setting the Project's First Play for information on setting the First Play for different types of projects. See Assigning the First Play Element for information on setting the First Play using the Outline or Graphical tab.

General Tab in the Disc Inspector

All of the settings in the General tab except the DVD-ROM settings must be set before building a project.

Standard Settings

- *DVD Standard:* Shows the DVD standard for this project.
  - *SD DVD:* When set to SD DVD, you can convert the project to HD-based DVD by clicking the HD DVD button.
  - *HD DVD:* When set to HD DVD, however, you cannot change the project back to SD DVD. See Setting the DVD Standard for more information.
- *Video Standard:* Select the type of video used in this project, NTSC or PAL. This must be set before you import any video assets. See Setting the Video Standard for more information.

Streams

- *Audio:* You can choose an audio stream that will serve as the initial active stream, overriding the DVD player's setting. The default setting is "not set," which lets the DVD player control the stream setting.

  Note: The word *Empty* in parentheses after a stream number indicates that that stream is currently empty.
- *Angle:* You can choose a video stream that will serve as the initial active stream, overriding the DVD player's setting. The default setting is "not set," which lets the DVD player control the stream setting.

- *Subtitle:* You can choose a subtitle stream that will serve as the initial active stream, overriding the DVD player's setting. You can also force the subtitle stream to appear by selecting its View checkbox. The default setting is "not set," which lets the DVD player control the stream setting.

Remote Control

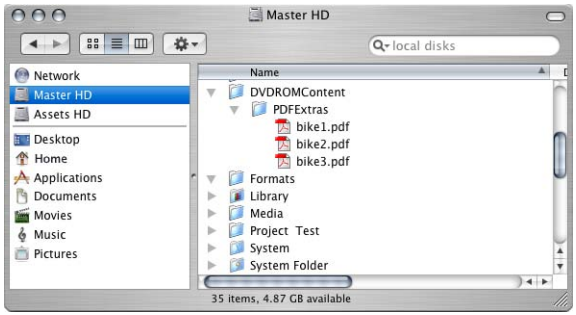
- *Title, Menu, and Return:* You can set the Title, Menu, and Return remote control settings, which correspond to a DVD player's remote control buttons. See Remote Control Settings for details on setting these buttons.

DVD-ROM

See About DVD-ROM Discs for details on using these settings and creating DVD-ROM discs.

- *Content:* Specifies whether this is a DVD-Video or DVD-ROM title. Selecting Content enables the DVD-ROM content settings (Location and Joliet Extension Support).
- *Size:* Shows the size of the files the folder chosen as the Location contains. This size uses the same convention as used by DVD media—one MB is equal to 1,000,000 bytes. The size is also shown in actual bytes.
- *Location:* This setting is active only when you select Content. The Location setting lets you choose the folder to include as the DVD-ROM contents for the disc. All files and folders at this location (but not the actual folder specified with the Location setting) are added to the root of the DVD.

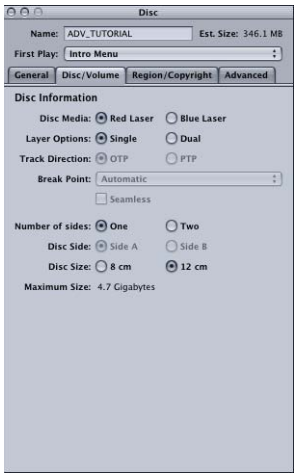
  For example, if you want several PDF files to be in a folder named PDFExtras at the root of the DVD, you would have to create the PDFExtras folder, place the PDF files in it, then place that folder in the folder you specify as the Location (DVDROMContent in the example below).



- *Joliet Extension Support:* This setting is active only when you select Content. Selecting Joliet Extension Support affects the filenames allowed in the DVD-ROM content when using red laser media. See Joliet Volume for more information.

Disc/Volume Tab in the Disc Inspector

These settings do not need to be set until you format your project. However, choosing the disc media, size, and layer options will ensure the toolbar's disc meter is correct.



- *Disc Media:* Available for HD projects only (SD projects can only use red laser media). Choose the type of media your project will be distributed on. Red Laser refers to the media used with SD projects, although HD projects can also use it. Blue Laser refers to media used with HD projects.

  Important: This setting affects the scale of the toolbar's disc meter and the type of disc (red laser or blue laser) the replicator will create if you are using DDP or CMF when formatting your project. It does not affect what happens when burning a general media disc on your system.

- *Layer Options:* Choose either single- or dual-layer for the media.
- *Track Direction:* Use this control to select either PTP (Parallel Track Path, in which the second disc layer plays from the inner track to the outer track as the first layer does) or OTP (Opposite Track Path, in which the second layer plays from the outer track to the inner track, the opposite of the first layer). The advantage of the OTP method is that it minimizes the amount of time the DVD player spends seeking the next track when switching layers. See About Dual-Layer Discs for more information and tips on creating dual-layer discs.
- *Break Point:* Use this pop-up menu to choose the dual-layer break point. The Break Point setting controls where the division is between the first and second layer of the disc. You can select any marker on any track, although depending on how full the disc is, there may only be a limited number of usable options. When left as Auto, DVD Studio Pro automatically chooses the break point. See About Dual-Layer Discs for more information on creating dual-layer discs.
- *Seamless:* Select Seamless to configure the dual-layer break point as seamless.

Important: An alert appears when you select Seamless. Do not select Seamless unless your project specifically requires it. See Choosing Seamless or Non-Seamless Layer Changes for more information.

- *Number of sides:* Choose whether this is a one- or two-sided disc.

  Note: A two-sided disc requires two separate projects—one for each side.

- *Disc Side:* Choose Side A or Side B for this project. This is for the replication facility.
- *Disc Size:* Choose either the standard 12 cm or the smaller 8 cm disc size.
- *Maximum Size:* Based on the above settings, shows the maximum amount of disc space available.

Region/Copyright Tab in the Disc Inspector

The only setting in the Region/Copyright tab that you must set before building a project is the Macrovision setting.

- *Playable Region Codes:* Select the checkbox next to the regions in which you want to be able to play the disc (all are enabled by default). All DVD players (standalone and computer) must be assigned a region code. This code divides the world into six regions, with an additional region for discs played on airplanes. These region codes allow you to have some control over where a disc can be played.

  So that you can easily emulate on any DVD player the VIDEO_TS or HVDVD_TS folder created by the build process, the folder defaults to having all regions enabled (except "7-Reserved"). Region code settings are applied during the formatting process.

  Important: If you change the region code settings and burn a DVD using general media, some DVD players that should be prevented from playing it will play the disc. This issue does not occur with replicated discs originating from either general or authoring media. Additionally, you must have at least one playable region selected.

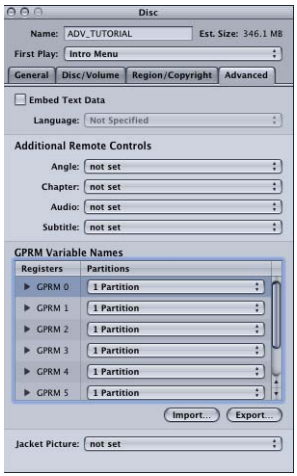
- *Copyright Management:* Select the checkbox to enable either digital-based or analog-based (Macrovision) copyright protection of the disc. Selecting this checkbox enables the Copy Generation setting.

  Note: This setting affects the number of bytes in each sector of the disc. With copyright management disabled, each sector has 2048 bytes. With copyright management enabled, each sector has 2054 bytes.

- *Copyright Generation:* This pop-up menu specifies whether copies are allowed.
  - *Copying Permitted:* The disc is not protected against copying. The Format for CSS checkbox and Macrovision pop-up menu are disabled. The only difference between this setting and leaving the Copyright Management checkbox unselected is the number of bytes in the sectors.
  - *One Copy Permitted:* Allows users to make a copy of the disc, but no additional copies from that copied disc (the Copy Generation status of the copied disc switches to No Copy Permitted). You can make as many copies as you want from the original disc; you just can't make more copies from the copies of the original. The Format for CSS checkbox and Macrovision pop-up menu are disabled.
  - *No Copy Permitted:* Enables the Format for CSS checkbox and Macrovision pop-up menu so that you can choose the type of copy protection to use.
- *Format for CSS:* Available in SD DVD projects only. Only available when Copy Generation is set to No Copy Permitted. The Content Scrambling System (CSS) provides digital-based copyright protection. Selecting Format for CSS alerts the replication facility to apply CSS encryption to the disc (if it is licensed and authorized to do so).
- *Macrovision:* Available in SD DVD projects only. This must be set before you create the VIDEO_TS folder in the build process. Macrovision provides analog-based copyright protection. See About the Macrovision Settings for more information.

Advanced Tab in the Disc Inspector

All of the settings in the Disc Inspector's Advanced tab must be set before you build a project. These settings apply to specialized features used on advanced projects.



- *Embed Text Data:* This checkbox is automatically selected if you use the DVD@CCESS feature within your project. You can also select it if you want to add the names you assigned to the tracks, slideshows, and menus to the DVD disc. This text can be displayed on DVD players designed to support the Text Display extensions of the DVD-Video specification (version 1.1).
- *Language:* If the Embed Text Data checkbox is selected, you can identify the language in which the text names will appear. Choose Not Specified to have the text appear regardless of the DVD player's language setting.
- *Additional Remote Controls:* You can set the Angle, Chapter, Audio, and Subtitle menu remote control settings, which correspond to a DVD player's remote control buttons. These links can make it convenient for viewers to access DVD menus that allow them to select audio and subtitle options, an angle, or a chapter. However, be sure to design your title with other ways to reach these DVD menus, because very few remote controls offer these buttons.

  Important: Do not confuse these buttons with the Audio, Subtitle, and Angle selection buttons commonly found on remote controls—these buttons do not access a menu, and instead directly change the settings.

  See Remote Control Settings for details on setting these buttons.
- *GPRM Variable Names:* You can configure the partitions and enter names for the eight GPRMs used when creating scripts. Once you create a script, you can also enter these names in the Script Inspector or the Simulator. See General Purpose Register Memories for information on using GPRMs in your scripts.

- *Jacket Picture:* You can choose a graphic to use as the jacket picture for this DVD. See About Jacket Pictures for more information.

Building Your Project

Building a project compiles all of the elements into files that conform to the DVD-Video specification (SD projects). Before you build your project, you must make sure you have set your prebuild disc properties.

Prebuild Disc Properties

The prebuild disc properties include the following items from the Disc Inspector. See Setting Disc Properties for details on these properties. You must set these properties before you can build your project.

- *First Play:* Located at the top of the Disc Inspector.
- *Video Standard:* Located in the General tab.
- *Streams:* Located in the General tab.
- *Remote Control:* Located in the General tab.
- *Macrovision:* (SD projects only) Located in the Region/Copyright tab.
- *Embed Text Data:* Located in the Advanced tab.
- *Additional Remote Controls:* Located in the Advanced tab.
- *GPRM Variable Names:* Located in the Advanced tab.
- *Jacket Picture Asset:* Located in the Advanced tab.

About the Macrovision Settings

If your SD project is to be coded for Macrovision Analog Protection System (APS) copy protection, you must choose the Macrovision type before you build the project.

Important: The Macrovision APS is not available for HD projects.

The Macrovision APS is an analog copy protection system that alters the video signal in such a way as to discourage viewers from making copies of your DVD-Video disc onto a videocassette recorder.

Macrovision Licensing

Use of analog copy protection for DVD applications is subject to the proprietary intellectual property rights of Macrovision Corporation, of Sunnyvale, California, and users must complete a usage agreement with Macrovision Corporation before the analog protection system activation bits are set to "on." For further information, see the Macrovision website at http://www.macrovision.com.

To enable Macrovision APS

1. Open the Disc Inspector by selecting the disc in the Outline tab or clicking an empty area in the Graphical tab.
2. Click the Region/Copyright tab.
3. Select the Copyright Management checkbox.
4. Choose No Copy Permitted from the Copy Generation pop-up menu.
5. Choose the type of Macrovision protection to use (Type 1, Type 2, or Type 3) from the Macrovision pop-up menu.

Note: The Format for CSS checkbox has no bearing on the Macrovision setting.

The Macrovision coding is applied to the entire disc. Once you have chosen No Copy Permitted from the Copy Generation pop-up menu, you can also apply or change Macrovision coding on specific tracks and markers using the Other tab in each track's Inspector and the General tab in each marker's Inspector.

Note: If you configure Macrovision on a track or marker before you configure it for the disc in the Disc Inspector, the settings in the Disc Inspector automatically update to match the track or marker settings.

Three Macrovision types are supported by the DVD-Video specification:

- *Type 1:* Uses the Automatic Gain Control (AGC) process. The AGC process places pulses in the vertical interval of the video stream that televisions do not detect. When a copy is attempted, these pulses confuse a VCR's AGC circuitry, causing copies to exhibit characteristics such as dim and noisy pictures, loss of color, loss of video, and picture tearing.
- *Type 2:* Uses both the AGC process and a two-line colorstripe. The colorstripe process, which is only effective with NTSC video streams, consists of changes to colorburst information that are transparent on original viewing, but that produce horizontal lines across the picture when playing an unauthorized copy. The 2-line version of colorstripe has bands of altered chrominance 2 horizontal lines long.
- *Type 3:* Uses both the AGC process and a four-line colorstripe. The 4-line version of the colorstripe process has bands of altered chrominance 4 horizontal lines long. This is also only effective with NTSC video streams.

About Jacket Pictures

Jacket pictures are an optional part of the DVD-Video specification and are intended to allow a DVD player to display a graphic representing a DVD. Jacket pictures are most commonly displayed on multi-disc players.

Based on the DVD specification, Jacket Picture graphics should be supplied in three different resolutions (small, medium, and large) for display on different platforms and display devices. DVD Studio Pro automatically generates the required graphics and the folder that holds them, JACKET_P, when you build your project.

To add a jacket picture to your project

1 Import the graphic to use for the jacket picture into the Assets tab.

2 Choose the jacket picture graphic from the Asset pop-up menu in the Disc Inspector's Advanced tab.

The jacket picture will appear in the Simulator when you stop playback.

Building the Project

Once you have set the prebuild disc properties, you can build your project. Depending on the size of your project and the speed of your computer and disk drives, this process can take several hours to finish.

To build your project

1 Do one of the following:

- Click Build in the toolbar.

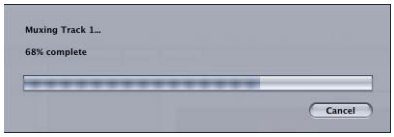
  Note: To format the project immediately after building it, click Build/Format. See About the Build/Format Command for more information.

- Press Command-Option-C.

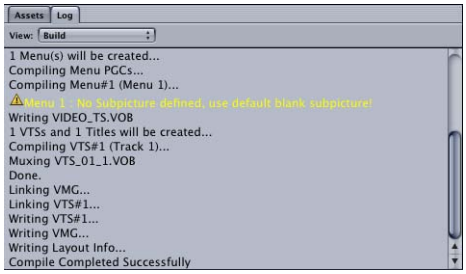
2 Select the drive and folder to build to in the dialog that appears, then click Open.

The build process begins and a progress bar appears that shows the element names currently being compiled. If the selected folder already has a folder of the same type it is generating (VIDEO_TS or HVDVD_TS), see Incremental Builds for details on the dialog that appears.

Note: You cannot build an SD project in a folder that already contains an HVDVD_TS folder, and you cannot build an HD project in a folder that already contains a VIDEO_TS folder.



The Log tab also appears, automatically switching to display the build results. The tab shows details on the build's progress, as well as messages about any errors that occur.



Incremental Builds

While creating your project, you may find it useful to perform builds several times before you are actually finished with it. These incremental builds can be useful to verify that certain aspects of the project are functioning properly, such as a set of scripts or a menu's button navigation.

To help with this process, DVD Studio Pro includes the ability to reuse unchanged elements from a previous build. This can greatly speed up the build process when you perform incremental builds.

Once you select a folder to build into, DVD Studio Pro checks to see whether a folder of the same type it needs to create (VIDEO_TS or HVDVD_TS) is already present. If the folder already contains a folder of the same type, with a .layout file that has the same name as the project, a dialog appears for you to specify what should happen.

- *Cancel:* Closes this dialog and the build process without saving anything.
- *Delete:* Deletes the current contents of the VIDEO_TS or HVDVD_TS folder and begins saving the new build information.
- *Reuse:* Attempts to reuse as much of the current VIDEO_TS or HVDVD_TS folder contents as possible.

If you decide to reuse the VIDEO_TS or HVDVD_TS folder, DVD Studio Pro looks at its contents and, for each VTS block, checks to see if anything has changed from the last build. If the VTS block has not changed, the message "VOB up to date. Muxing skipped" appears in the Log tab and the build moves on to the next VTS block. See Non-Standard SD DVD Video Zone Files for more information about .layout files.

General Build Information

Depending on your system and the size of your project, the build process might take several hours. Following is some information on speeding up the process.

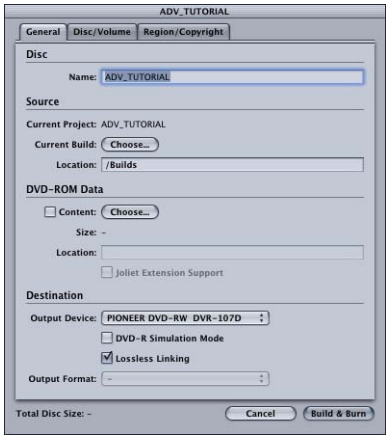
Using Multiple Hard Disks

One way to speed up the build process is to have the project's assets on a disk completely different from the one you are building to (not just a second partition of the same disk). Using different disks for your assets and your build allows each disk to focus on either reading or writing data, rather than jumping from one function to the other.

About the Build/Format Command

Because the build and format processes take a lot of time, it is common to want to start them and let the processes run unattended. How well this will work depends on the type of project you are creating.

When you choose the Build/Format command, a dialog appears in which you can set your build location and the format properties.



Once you have set the source and destination settings, including the preformat settings in the Disc/Volume and Region/Copyright tabs, click the Build & Format button to start the process. If you have chosen a DVD or DLT drive as the output device, you are prompted to insert a blank disc or tape. See Output Type Settings for information on setting the destination, and Setting Disc Format Properties for more information on these settings.

The following issues make dual-layer projects more difficult to run unattended:

- During the format part of the process, you will have to load a second blank disc or tape once the first layer is written.
- There may be problems with the break point. If you chose the Automatic mode for setting the break point, it is possible that a suitable marker may not exist. Additionally, if you chose a specific marker to use as the break point, it may not be suitable. DVD Studio Pro is unable to confirm either of these issues until the build part of the process finishes. If there is a problem, an error dialog appears and the format process is not started. Once you correct the problem by adding or selecting a different marker, you will have to start the build/format process over again.

See About Dual-Layer Discs for more information on setting a break point.

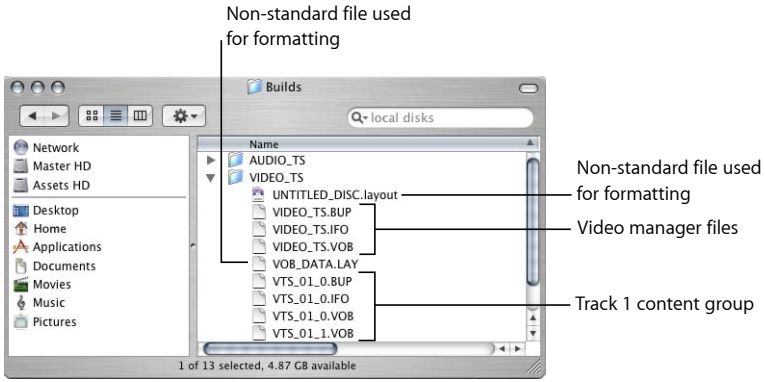
The Build Files for SD Projects

Once the build for your SD project starts, DVD Studio Pro creates two folders at the location you specified: an AUDIO_TS folder and a VIDEO_TS folder. Additionally, a third folder, JACKET_P, is created if you have assigned a jacket picture graphic.

The AUDIO_TS folder is used by systems authoring DVD-Audio titles. To meet the DVD specification requirements, DVD Studio Pro creates the folder and leaves it empty. The empty folder is included in the format process.

The JACKET_P folder contains three resolutions of the graphic assigned as the jacket picture. See About Jacket Pictures for more information.

The VIDEO_TS folder contains all of the DVD-Video files for your project, and is placed in the video zone. The naming and structure contents of the VIDEO_TS folder are tightly regulated. All SD DVD titles use the same filenames and structure their contents in the same way.



Standard SD DVD Video Zone Files

The following groups of files are present in the video zone of all SD DVD-Video titles.

Video Manager Group

The video manager files contain much of the navigation information for the title.

- *VIDEO_TS.IFO:* Contains the major information for the disc, such as its capacity and video zone structure.
- *VIDEO_TS.BUP:* This is a backup of the .IFO file that can be used by the DVD player if the .IFO file cannot be read.
- *VIDEO_TS.VOB:* This is the video objects file for the video manager.

Track Content Group

A set of at least four files is created for each track and slideshow in the project. "VTS_01" in the following filename examples refers to the first VTS block. Files for the second VTS block would start with "VTS_02." You can have up to 99 tracks, stories, and slideshows in a project.

Note: While stories do not get placed in their own VTS block, they still count against the 99 VTS limit.

Video object files (VOB) contain the actual video, audio, and subtitle content for the menus and tracks. The maximum size of each VOB file is 1 GB. Within each track content group there are at least two VOB files—one that is dedicated to menu content and another (up to eight more) with the track's contents.

- *VTS_01_0.IFO:* Contains the major information for the first track, such as the number and types of streams and menus.
- *VTS_01_0.BUP:* This is the backup for the .IFO file.
- *VTS_01_0.VOB:* Contains the video and audio content for the menus. The properties of the audio and video used in the menus within a VOB must be the same. If your project has menus using different properties, they are placed in other VTS blocks (VTS_02_0.VOB, for example). See VTS Editor for more information on menus and VTS blocks.
- *VTS_01_1.VOB:* Contains the video and audio content for the track. If the content is greater than 1 GB, a second file (VTS_01_2.VOB) is created for that additional content. Up to seven additional files can be created if required to hold the track's contents.

Non-Standard SD DVD Video Zone Files

As part of the build process, DVD Studio Pro creates two additional files in the VIDEO_TS folder. The format process does not include these files in its final output.

- *A .layout file:* This file uses the disc name and a ".layout" extension. The file contains project information used by the format process, including the marker information used when creating dual-layer discs.
- *A VOB_DATA.LAY file:* This file is used for incremental builds when you choose to reuse files in the VIDEO_TS folder left from a previous build for a new build.

  Note: The .layout filename must match the disc name for an incremental build to work. See Incremental Builds for more information.

If you intend to manually copy the VIDEO_TS folder to a disc (bypassing the DVD Studio Pro format process), you should be sure not to copy the above files to the disc. Most DVD players ignore them if they are present in the VIDEO_TS folder on the final disc, but some are unable to play the disc.

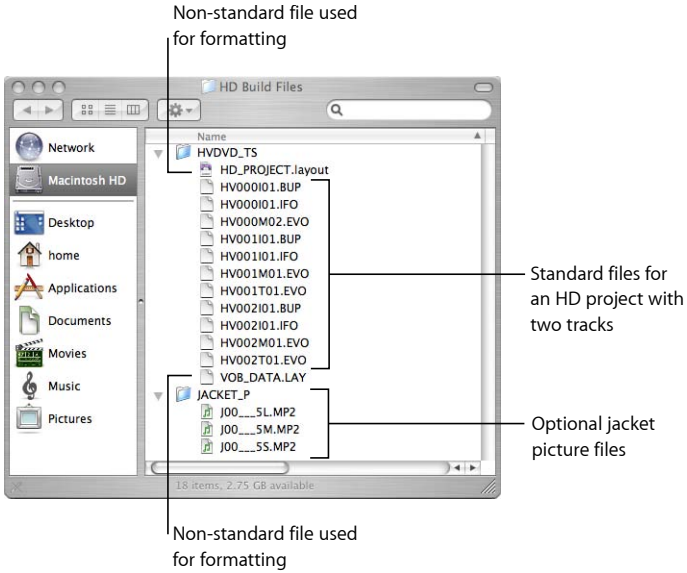
Additionally, if you have not saved your project before you build it, a folder is added to the VIDEO_TS folder named Render Data. This folder contains rendered versions of any motion menus in your project, and is normally in your project's bundle file. See Menu Preferences for more information on rendered menu files.

The Build Files for HD Projects

Once the build for your HD project starts, DVD Studio Pro creates an HVDVD_TS folder at the location you specified. A second folder, JACKET_P, is created if you have assigned a jacket picture graphic.

The JACKET_P folder contains three resolutions of the graphic assigned as the jacket picture. See About Jacket Pictures for more information.

The HVDVD_TS folder contains all of the DVD-Video files for your project, and is placed in the video zone. The naming and structure contents of the HVDVD_TS folder are tightly regulated. All HD DVD titles use the same filenames and structure their contents in the same way.



Standard HD DVD Video Zone Files

The following groups of files are present in all HD DVD-Video titles.

Video Manager Group

The video manager files contain much of the navigation information for the title.

- *HV000I01.IFO:* Contains the major information for the disc, such as its capacity and video zone structure.

- *HV000I01.BUP:* This is a backup of the .IFO file that can be used by the DVD player if the .IFO file cannot be read.
- *HV000M02.EVO:* This is the enhanced video objects file for the video manager.

  Note: The file HV000M01.EVO is not used by DVD Studio Pro.

Track Content Group

A set of at least four files is created for each track and slideshow in the project. "HV001I," "HV001M," and "HV001T" in the following filename examples refer to the first VTS block. Files for the second VTS block would start with "HV002I," "HV002M," and "HV002T." You can have up to 99 tracks, stories, and slideshows in a project.

Note: While stories do not get placed in their own VTS block, they still count against the 99 VTS limit.

Enhanced video object (EVO) files contain the actual video, audio, and subtitle content for the menus and tracks. Within each track content group there are at least two EVO files—one that is dedicated to menu content and another (up to 99 more) with the track's contents.

- *HV001I01.IFO:* Contains the major information for the first track, such as the number and types of streams and menus.
- *HV001I01.BUP:* This is the backup for the .IFO file.
- *HV001M01.EVO:* Contains the video and audio content for the menus. The properties of the audio and video used in the menus within an EVO must be the same. If your project has menus using different properties, they are placed in other VTS blocks (HV002M01.EVO, for example). See VTS Editor for more information on menus and VTS blocks.
- *HV001T01.EVO:* Contains the video and audio content for the track. If the content is greater than 1 GB, a second file is created for that additional content. Up to 99 additional files can be created if required to hold the track's contents. The last two digits of the filename increment as additional files are created. For example, the first 1 GB would be in HV001T01.EVO, the second 1 GB would be in HV001T02.EVO, and so on.

Non-Standard HD DVD Video Zone Files

As part of the build process, DVD Studio Pro creates two additional files in the HVDVD_TS folder. The format process does not include these files in its final output.

- *A .layout file:* This file uses the disc name and a ".layout" extension. The file contains project information used by the format process, including the marker information used when creating dual-layer discs.
- *A VOB_DATA.LAY file:* This file is used for incremental builds when you choose to reuse files in the HVDVD_TS folder left from a previous build for a new build.

Note: The .layout filename must match the disc name for an incremental build to work. See Incremental Builds for more information.

If you intend to manually copy the HVDVD_TS folder to a disc (bypassing the DVD Studio Pro format process), you should be sure not to copy the above files to the disc. Most DVD players ignore them if they are present in the HVDVD_TS folder on the final disc, but some are unable to play the disc.

Additionally, if you have not saved your project before you build it, a folder is added to the HVDVD_TS folder named Render Data. This folder contains rendered versions of any motion menus in your project and is normally in your project's bundle file. See Menu Preferences for more information on rendered menu files.

Emulating Your Project Using DVD Player

Once you have successfully built your project and have a VIDEO_TS or HVDVD_TS folder, you can test it using the Apple DVD Player. This process allows you to verify your project using the actual compiled files.

An advantage of using the Apple DVD Player is that it can play directly from a VIDEO_TS or HVDVD_TS folder. It also allows you to select which VIDEO_TS or HVDVD_TS folder to play, if there are multiple folders on your system.

Important: You must use DVD Player v4.6.6 or later with Mac OS X v10.4 Tiger to play the HVDVD_TS folder.

In addition to testing with DVD Player, it is also recommended that you try your project on other DVD players. Some computer DVD players will play from the VIDEO_TS or HVDVD_TS folder, but may require the folder to be at the root level of your disk. To test on a standalone DVD player, you must go through the format process and create a DVD disc. This is the most comprehensive test you can perform on your project and is highly recommended.

The Apple DVD Player works well as an emulation tool. It is provided with Mac OS X on computers with a DVD drive. It can play from a disc or from a specified VIDEO_TS or HVDVD_TS folder. It also processes any DVD@CCESS links you have added to your project.

Note: To avoid conflicts, be sure to quit DVD Studio Pro before opening DVD Player. Once you have finished with DVD Player, be sure to quit it before opening DVD Studio Pro.

To emulate your project with DVD Player

1. Quit DVD Studio Pro.
2. Open DVD Player by double-clicking its icon in the Applications folder.

3 To select a VIDEO_TS or HVDVD_TS folder, choose either File > Open DVD Video Folder or File > Open VIDEO_TS Folder (depending on your version of DVD Player), or press Command-O.

4 Use the navigation dialog to locate the VIDEO_TS or HVDVD_TS folder, then click Choose.

5 To play the VIDEO_TS or HVDVD_TS folder, do one of the following:

- Click the Play button.
- Press the Space bar.

The title starts playing, based on its First Play action.

Emulating DVD@CCESS Links

DVD Player can process your DVD@CCESS links. You must first enable its DVD@CCESS capability.

To emulate DVD@CCESS links with DVD Player

1 Choose DVD Player > Preferences.

2 Click the Disc tab.

3 Select the Enable DVD@CCESS Web Links checkbox.

4 Click OK.

There are two types of DVD@CCESS links: those that use network access (such as connecting to a URL or sending an email) and those that open a file. When emulating a VIDEO_TS or HVDVD_TS folder, you can't process links that open a file because the path you entered when setting the link most likely does not match the file's current path (especially if the file is intended to be included on the DVD disc). To verify DVD@CCESS links that open a file, you must actually burn a DVD disc and emulate directly from the disc.

See DVD@CCESS for details on using the DVD@CCESS feature.

Emulating Dual-Layer Projects

The build process for dual-layer projects is the same as for single-layer projects—it creates a single large VIDEO_TS or HVDVD_TS folder and compiles the files. You can emulate the project using DVD Player, but you will not be able to emulate the action at the dual-layer break point because it has not yet been set. (That happens in the format process.)

Note: You can burn your dual-layer project to a double-layer disc to test the break point action.

Setting Disc Format Properties

Before formatting and writing your DVD disc, DLT, or hard disk files, you must configure your disc's format properties. Most of these settings can be made at any time in the authoring process. Additionally, you are given the opportunity to set these after you start the format process.

The preformat disc properties include the following items from the Disc Inspector. See Setting Disc Properties for details on these settings. These same settings are in the format dialog that appears when you start the format process. In all cases, the items appear in the same tab in both the Disc Inspector and the format dialog. Any differences are listed below.

- *Disc Name:* Located at the top of the Disc Inspector and in the General tab in the format dialog.
- *DVD-ROM:* Located in the General tabs. The size of the DVD-ROM content appears in the format dialog.
- *Disc Information:* Located in the Disc/Volume tab.
- *Volume Information:* Located in the Disc/Volume tab of the format dialog. Shows the volume creation date.
- *Playable Region Codes:* Located in the Region/Copyright tab.
- *Copyright Management:* Located in the Region/Copyright tab. The Macrovision settings are disabled in the format dialog because these must have been set prior to building the project.
- *Destination:* Located only in the format dialog's General tab. See Output Type Settings for more information.

About DVD-ROM Discs

You can create either DVD-Video or DVD-ROM discs with DVD Studio Pro.

- *DVD-Video discs:* Contain the VIDEO_TS or HVDVD_TS and AUDIO_TS folders only.
- *DVD-ROM discs:* Contain the VIDEO_TS or HVDVD_TS and AUDIO_TS folders, as well as other files you specify.
- *ROM-only DVD discs:* Do not contain the VIDEO_TS, HVDVD_TS, or AUDIO_TS folders—they contain only other files you specify.

DVD-ROM discs, also known as *hybrid discs*, play on standalone DVD players the same way DVD-Video discs do. When played on a computer, however, the additional files on the disc can be accessed, either directly or as part of a DVD@CCESS link. See DVD@CCESS for more information on DVD@CCESS.

Note: The type of DVD project you are creating, SD or HD, determines the type of volumes that are created. SD projects create a UDF 1.02 volume and HD projects create a UDF 2.50 volume, regardless of the disc type actually being burned. UDF 2.50 volumes will not play in current SD DVD players and are not supported by older computers, including those running Mac OS X v10.3 Panther or earlier.

Filenaming Issues with Red Laser Media

A DVD-Video disc can contain several folders: VIDEO_TS, HVDVD_TS, AUDIO_TS, and JACKET_P. The filenaming structure within these folders is very strict and tightly defined, and conforms to the "8.3" specification. That is, only eight characters maximum are allowed, followed by a three-character extension. The only allowed characters are uppercase letters, numbers, and the underscore.

The names of files on a red laser disc are kept track of in two volumes—a UDF 1.02 (Universal Disc Format version 1.02) volume and an ISO 9660 volume, which together are known as the *UDF Bridge Format*. The advantage of having the two volumes is that it makes the DVD disc usable on a wider variety of playback devices. A potential disadvantage is that each volume has its own filenaming rules. In the case of a DVD-Video disc, because the only files present are those within the VIDEO_TS and AUDIO_TS folders, the names in both volumes are identical.

A DVD-ROM disc also contains the VIDEO_TS and AUDIO_TS folders, and each must follow the same strict filenaming rules that apply to a DVD-Video disc. The difference is that the disc also contains folders and files outside of these normal DVD-Video folders. In addition, a third volume, the Joliet volume, may be created.

As soon as you choose the DVD-ROM Content checkbox, the Joliet Extension Support checkbox becomes active. Use this to control the filenaming conventions applied to those nontraditional files.

The following sections describe the filenaming conventions that apply to the different types of volumes on a DVD.

UDF 1.02 Volume

All SD DVDs using red laser media have a UDF 1.02 volume. The UDF volume always supports long (up to 255 characters) Unicode filenames. Unicode is a double-byte system allowing far more characters than the standard ASCII (single-byte) system. This is very useful when you want to use Japanese characters, for example. It also supports folders with extensions. Note that some operating systems prohibit the use of certain characters (\ / ? : " < > |) in filenames. Standalone DVD players use the UDF volume to begin playing a disc, but only to locate the first files. They never go beyond the VIDEO_TS and AUDIO_TS directories. Macintosh computers using Mac OS 9 and Mac OS X use the UDF volume.

ISO 9660 Volume

All DVDs also have an ISO 9660 volume. This volume only supports filenames with single-byte ASCII characters. The ISO 9660 volume must conform to the "26.3" specification, similar to the "8.3" specification mentioned earlier (26 characters maximum followed by a 3-character extension; the only allowed characters are uppercase letters, numbers, and the underscore). In addition, folders cannot have extensions in their names. Filenames are automatically truncated and invalid characters replaced with an underscore. Filenames using double-byte characters exclusively are renamed as FILE_1, FILE_2, and so on.

Joliet Volume

Once you have selected the DVD-ROM Content checkbox, the Joliet Extension Support checkbox becomes active.

Important: The Joliet Extension Support checkbox is only applicable when writing to red laser media. It has no effect when writing to blue laser media.

Selecting the Joliet Extension Support checkbox forces the creation of the Joliet volume. This volume supports long Unicode filenames, just like the UDF volume, but has a limit of 110 characters. Folders with extensions are also supported. Filenames longer than 110 characters are automatically truncated. When not selected, the Joliet volume is not created.

Note: In rare cases, enabling the Joliet Extension Support checkbox and adding a number of files with extended character set names to the disc may create playback problems on some older DVD players. Select it only if you need to include such files and can test the disc on your intended players.

Filenaming Issues with Blue Laser Media

Blue laser media contains only one volume—a UDF 2.5 volume. For the purposes of filenaming, a UDF 2.5 volume has the same rules as the UDF 1.02 volume found on red laser DVDs. See UDF 1.02 Volume for more information.

Important: Older computer operating systems, including Mac OS X v10.3 Panther and earlier, and DVD players do not support UDF 2.5 volumes whether on red or blue laser discs.

Creating ROM-Only DVD Discs

You can use DVD Studio Pro to create DVD discs that contain only ROM data. The advantage of using DVD Studio Pro to do this (as opposed to using the Finder) is that, depending on whether you are using red laser or blue laser media, the volumes that are created are compatible with the DVD specification.

To create a ROM-only DVD disc

1 Do one of the following:

- Select the project's name (next to the disc icon) in the Outline tab.

- Click an empty area in the Graphical tab.

The Disc Inspector appears.

2 Click the General tab in the Disc Inspector.

3 Select the SD DVD setting for DVD Standard to write to red laser media, or the HD DVD setting to write to blue laser media.

4 Do one of the following:

- Choose File > Advanced Burn > Format (or press Command-F).
- Click Format in the toolbar.

The format dialog appears.

By default, DVD Studio Pro assumes you want to format the project that was built last. The settings in the format dialog are set to match the last build.

5 Verify the settings in the Disc/Volume and Region/Copyright tabs are correct.

This includes making sure the correct media type (red or blue laser) is selected as well as the layer options (single or dual).

6 In the General tab's Source section, do one of the following:

- Use the Current Source pop-up menu (labeled "Choose") to navigate to a folder without a VIDEO_TS or HVDVD_TS folder.
- Highlight and delete the text displayed in the Location text entry area.

An alert appears warning you that no DVD content could be found in that location.

7 Configure the DVD-ROM Data section.

8 Configure the Destination section in the General tab in the format dialog. This is where you select and configure the output type. See Output Type Settings for more information.

9 Click Burn to start formatting the project if you are writing to DVD or DLT, or Format if you are writing to a hard disk.

About Dual-Layer Discs

Dual-layer discs present several challenges:

- *You can only fully test the break point if your system can burn to double-layer media:* When you burn a dual-layer project to a double-layer disc using DVD Studio Pro, the break point, where the DVD player switches from one layer to the other, is placed as it would be with a replicated disc. See Emulating Dual-Layer Projects for more information.

  Note: DVD Studio Pro also allows you to burn a dual-layer project to a single-layer disc. In this case, all of the first layer and as much of the second layer as possible is written to the disc, with the marker that is used as the break point set to be non-seamless (unless you have chosen the seamless layer change setting).

- *The second layer's direction must be selected:* You need to decide whether to use the Parallel Track Path (PTP) or Opposite Track Path (OTP) direction. See Setting the Dual-Layer Direction for more information.
- *A break point must be chosen:* The point where the first layer ends and the second begins can be chosen automatically by DVD Studio Pro, or you can select the track marker that serves as the break point. See About Choosing a Dual-Layer Break Point for more information.

Dual-layer discs allow you to place nearly twice as much content on a single disc side, but there is a downside to this method: At some point, the DVD player must switch from reading the first layer to reading the second layer. Switching between layers requires the player's laser to refocus and then locate the sector at which to start playing. During this time, the video image freezes, which may confuse viewers or make them think the disc is defective.

There are two things you can do to minimize the effect of this switch time: Use the OTP direction to minimize how long it takes, and choose a break point where a freeze is not as noticeable. Alternatively, you can choose to use a seamless layer change.

Choosing Seamless or Non-Seamless Layer Changes

DVD Studio Pro includes a setting that allows you to choose between a seamless layer change or a non-seamless layer change.

With the seamless layer change, the switch between the first and second layer is less detectable. With the non-seamless layer change, there is a short pause when the DVD player switches between the layers.

While the seamless layer change would appear to be the best choice, some DVD players do not support the seamless feature, and may stop playing the disc once the switch point is reached. For that reason, *it is strongly suggested that you use the default non-seamless layer change setting*.

To change the layer change setting

1. Click the Disc/Volume tab in the Disc Inspector.
2. Do one of the following:
   - *To use the normal layer change setting:* Leave the Seamless checkbox deselected.
   - *To force a non-standard seamless layer change setting:* Select the Seamless checkbox.

Setting the Dual-Layer Direction

The disc's first layer always starts on the inside edge, near the disc's spindle hole. The disc plays from this point toward the outer edge.

It is the second layer's direction that you have to choose. With the Parallel Track Path (PTP) setting, the second layer is configured exactly like the first layer—it begins on the inside and plays toward the outside. With the Opposite Track Path (OTP) setting, the second layer begins on the outside edge and plays toward the inside.

Note: Double-layer discs require you to use the OTP setting.

With the PTP setting, the DVD player will need more time when switching between layers because the laser must be repositioned from one end of the disc to the other. Using the OTP setting minimizes the time needed to reposition the laser because the end of the first layer is near the beginning of the second layer.

Important: When using the OTP setting, the first layer must be larger than the second layer.

About Choosing a Dual-Layer Break Point

Several factors need to be taken into account when you choose where to place the dual-layer break point:

- *Break points must be on track markers:* When you choose the break point, you get a list of track markers to choose from. In some circumstances, you may need to place a marker on a track just for this purpose. See Setting the Dual-Layer Break Point for more information.

  Note: In some special cases, you can set your dual-layer break point in the DVD-ROM area. See Setting the Break Point with Large DVD-ROM Contents for more information.

- *Break points need to be placed so that the first layer is mostly filled:* A red laser dual-layer disc can hold 7.95 binary gigabytes and a blue laser dual-layer disc can hold 27.94 binary gigabytes. (See Making Sure Your Content Will Fit for information on disc sizes and DVDs.) Each red laser disc layer can hold approximately 3.9 binary gigabytes, and each blue laser disc layer can hold approximately 13.9 binary gigabytes. The closer your project comes to filling the disc, the more critical it is that you get as much content as possible on the first layer, and place the break point accordingly. Additionally, using the OTP direction setting requires the first layer to be larger than the second layer. See Manually Determining the Break Point Position for information on determining at which track the first layer will be filled.

- *Break points are best when they are not noticed:* A layer switch that occurs during a tense action-packed scene can disrupt the viewer's attention. When possible, it is best to place the break point in a scene with little action, or even better, at a scene transition, such as a fade to black.

Setting the Break Point with Large DVD-ROM Contents

Authoring a project that contains a small amount of DVD-Video data with a large amount of DVD-ROM data requires special handling for placing the break point. For example, you might author a project for a dual-layer red laser disc that contains 2 GB of DVD-Video data and 6 GB of DVD-ROM data. In this case, you will not be able to set a break point at a track's marker because the DVD-ROM data will not fit on a single layer.

In these cases, setting the break point to Automatic places the break point in the DVD-ROM data.

Setting the Dual-Layer Break Point

There are several methods you can use to set a dual-layer break point:

- *The automatic method:* By default, once you configure the disc as dual-layer, Automatic is selected as the break point in the Disc/Volume tab in the Disc Inspector. With this setting, DVD Studio Pro chooses the last marker that fits in the first layer. In cases where there is a large amount of ROM data, the automatic method can also place the break point in the ROM data. See Setting the Break Point with Large DVD-ROM Contents for more information.

  If you are using the Build/Format command, the automatic method has the greatest chance of success, because it will be able to choose the break point marker once the build process is finished without having to pause for you to choose the marker to use.

  It is possible that your project does not have a suitable marker for use as the dual-layer break point. In that case, the format is canceled and you must add a suitable marker to a track in your project. (Another option might be to rearrange the order of the tracks in the VTS Editor. See Moving Elements from One VTS to Another for more information.) See Manually Determining the Break Point Position.

- *Assign a break point marker in the Track Editor:* This method allows you to choose the marker to use as the break point while working with your tracks. The disadvantage of this method is that, until you build your project, it can be difficult to choose a suitable marker as the break point. This is especially true if your project has a lot of transitions or you are using assets that have not yet been MPEG-2 encoded.

  If you choose an inappropriate marker, the format process will automatically cancel, with a dialog advising you of the problem it encountered.

- *Choose the break point marker when you start the format process:* After you have built your project, the Dual-Layer Break Point pop-up menu in the Disc/Volume tab in the format dialog shows all suitable markers that you can choose from, with those that are inappropriate dimmed. This option has the advantage of letting you choose the marker to use from a list of known suitable markers. The disadvantage is that you have to build your project first.

As with the automatic method, it is possible that there are no suitable markers, with no markers appearing in the pop-up menu. This means that you will have to add a suitable marker to a track in your project, or try rearranging the tracks in the VTS Editor. See Manually Determining the Break Point Position.

Manually Determining the Break Point Position

You can usually determine which track will be playing at the point where the break point is set by looking at the contents of the VIDEO_TS or HVDVD_TS folder. DVD Studio Pro writes the tracks to disc in their order in the Outline tab's By VTS display. For SD projects, the first track listed becomes VTS_01_1.VOB, VTS_01_2.VOB, VTS_01_3.VOB, and so on (depending on the size of the track's assets, with each VOB file being a maximum of 1 GB). The second track becomes VTS_02_1.VOB, and so on.

For HD projects, the first track listed becomes HV001T01.EVO, HV001T02.EVO, and so on, with each EVO file being a maximum of 1 GB. The second track becomes HV002T01.EVO.

See Standard SD DVD Video Zone Files and Standard HD DVD Video Zone Files for more information on identifying the files and on determining which files contain the menus, which will allow you to take them into account.

For example, when authoring for a red laser disc, by adding the file sizes together, starting with VTS_01, you can determine at which track the first layer's 3.9 GB limit will be reached, and even get a rough idea of where in that track this will happen. You may decide to reorder the tracks with the VTS Editor to ensure the break happens in a noncrucial track.

About Two-Sided Discs

A two-sided disc is a disc with separate projects on each side. Within DVD Studio Pro, you must create an independent project for each side. Some replication facilities allow you to have a single-layer project on one side and a dual-layer project on the other.

Formatting Your Project

Once you have built your project and set the preformat properties, you are ready to format it. The format process creates an output formatted for your output type:

- A DVD burning drive
- A DLT drive
- A hard disk

Each output type has its own settings that need to be configured before the actual format process begins.

In addition to the VIDEO_TS or HVDVD_TS folder, there are other items that can be part of the format process:

- A folder specified by the DVD-ROM content setting
- DVD@CCESS Installers

You can change or set the folder to use for DVD-ROM content either when specifying the preformat settings or while configuring the format process. The DVD@CCESS Installers are included if the project used DVD@CCESS links and the Embed Text Data checkbox in the Disc Inspector is selected. See DVD@CCESS for more information on DVD@CCESS.

You can also choose to read content from a DLT drive and format that content. See Reading a DLT Drive for more information.

Starting a Format Process

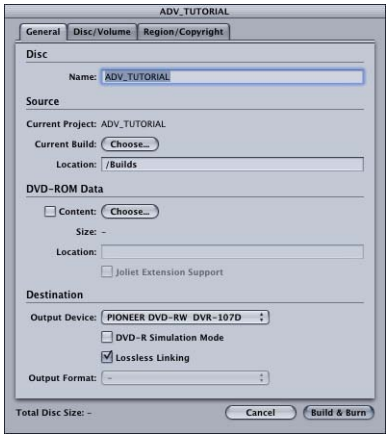
You can set the format process to start automatically after a build or you can manually start the format. In either case, a window appears at the beginning of the format process; you can set the format properties here, if you have not already set them in the Disc Inspector.

To format your project

1 Do one of the following:

- Choose File > Advanced Burn > Format (or press Command-F) to perform a format only.
- Click Format in the toolbar to perform a format only.
- Choose File > Advanced Burn > Build and Format (or press Command-Option-F) to perform both a build and a format. See About the Build/Format Command for more information.
- Click Build/Format in the toolbar to perform both a build and a format.

The format dialog appears.



By default, DVD Studio Pro assumes you want to format the project that was built last. The settings in the format dialog are set to match the last build. It is a good idea to verify that the settings in the General, Disc/Volume, and Region/Copyright tabs are correct.

You can use the Choose button next to Current Build to select a folder that contains the VIDEO_TS or HVDVD_TS folder you want to format.

Important: DVD Studio Pro attempts to find the .layout and .LAY files in the VIDEO_TS or HVDVD_TS folder you choose. An error message appears if they are not found, and in this case, you must manually configure the settings in the General, Disc/Volume, and Region/Copyright tabs. Additionally, if the VIDEO_TS or HVDVD_TS folder contains a dual-layer project, you are not able to specify the break point and must use the automatic method. See Non-Standard SD DVD Video Zone Files and Non-Standard HD DVD Video Zone Files for more information.

2 Configure the Destination section in the General tab in the format dialog. This is where you select and configure the output type. See Output Type Settings for more information.

3 Click Burn to start formatting the project if you are writing to DVD or DLT, Format if you are writing to a hard disk, or Build & Burn if you used the Build/Format command.

The format process begins and a progress bar appears that shows the format steps currently being performed.

Output Type Settings

Once you start the format process, you can configure the output type you want to format to. The Destination section in the General tab in the format dialog contains the output type settings.

- *Output Device:* Use this pop-up menu to choose the actual device to format to. It displays a list of your system's suitable output devices, including DVD-R drives, DLT drives, and the system's hard disk drive. The other Destination settings change depending on the device you select. See Output Devices for details on the devices available.
- *DVD-R Simulation Mode:* This is active only when writing to a DVD-R drive. When selected, the format goes through the motions of writing to the DVD-R drive, but does not actually write to the disc.

  Note: This mode can only be used with DVD-R media. It cannot be used with DVD+R media.

  This is useful when you want to ensure that your system is able to support writing to a disc without any buffer underrun issues. Buffer issues indicate that data is not flowing smoothly and continuously from the source disk to the DVD-R drive. This can be caused by a slow device (for example, a networked hard disk) or a system that is too busy doing additional tasks. (A buffer underrun error that occurs while data is actually being written to a disc results in an unusable disc.)

  Once you finish the simulation with no problems, you can deselect the DVD-R Simulation Mode checkbox and feel comfortable that you can safely burn a DVD.
- *Lossless Linking:* This checkbox is active only when writing to a DVD-R drive that supports this feature. When selected, it adds protection against buffer underrun conditions by allowing the drive to pause during the writing process, and then pick up where it left off once additional data becomes available.

  For normal DVD burning, especially on systems that may be prone to having buffer underrun conditions, it is suggested to select Lossless Linking.

  While Lossless Linking usually results in a flawless write process, there is a slight potential for an error to be introduced. If you are burning a disc for use by a replication facility, you may want to deselect Lossless Linking so that you can ensure that your disc is written without interruption.

- *Output Format:* Depending on the selected output device, there may be multiple formats available. Use this pop-up menu to select the specific format to use. See Output Devices for details on the formats available for each device.

Output Devices

There are three output device types that you can format your project for: DVD drives, DLT drives, and your system's hard disk.

DVD-R Drives

With respect to formatting, DVD drives can be one of two types:

- *Authoring:* These drives use authoring media and are capable of writing Cutting Master Format (CMF) discs, which provide advanced features when working with a replicator. The most common authoring drive used is the Pioneer S201. With an authoring drive, you can set the Output Format to either Standard or CMF. See The Cutting Master Format for more information on CMF discs.
- *General:* These drives use general media and cannot write CMF discs. The Apple SuperDrive is the most common drive used for writing general media discs. Depending on your system, the SuperDrive is listed in the Output Device pop-up menu as a Pioneer DVR-103, a Pioneer DVR-104, a Pioneer DVR-105, or a Matshita UJ-815.

  Note: The list of drives used as SuperDrives will continue to change as newer drives become available.

DLT Drives

You have three output format options when formatting an SD project to a DLT drive:

- *DDP 2.0:* Writes to the tape using the Data Description Protocol using DDP version 2.0.
- *DDP 2.1:* Writes to the tape using the Data Description Protocol using DDP version 2.1.
- *CMF 1.0:* Writes to the tape using the CMF format version 1.0.

If this is a dual-layer project, you will be required to write two tapes—one for each layer.

Important: You cannot use the DLT format to deliver your HD DVD projects to a replicator.

Hard Disk

In most cases, when you use the format process you will be writing directly to a DVD or DLT drive. Writing to the hard disk can be useful if you do not have a DVD or DLT drive available.

For example, if you have a project that needs copyright management and you don't have an authoring DVD-R drive or a DLT drive to get the project to your replicator, you can use a DDP or CMF output option and write the files to your hard disk. You can then copy the files as data to a general DVD disc or a FireWire drive for transport to your replicator. You may even be able to electronically copy the files to your replicator's server over the Internet.

Important: Be sure to verify with your replicator that they are able to work with files given to them this way. Additionally, be sure to find out which output option (DDP 2.0, DDP 2.1, or CMF 1.0 for SD projects and DDP 3.0 or CMF 2.0 for HD projects) they need you to use.

You have six output format options when writing to your hard disk:

- *DDP 3.0:* HD projects only. Use this (Data Description Protocol) option to create a file compatible with DLT drives using DDP version 3.0. This DDP option is required for HD projects when you need to use a DDP format.
- *DDP 2.0:* SD projects only. Use this (Data Description Protocol) option to create a file compatible with DLT drives using DDP version 2.0.
- *DDP 2.1:* SD projects only. Use this (Data Description Protocol) option to create a file compatible with DLT drives using DDP version 2.1.
- *CMF 2.0:* HD projects only. Writes to the tape using the CMF format version 2.0. This CMF option is required for HD projects when you need to use a CMF format.
- *CMF 1.0:* SD projects only. Use this option to create a file compatible with authoring DLT and DVD-R drives using CMF format version 1.0.
- *.img:* Use this option to create a disk image. With a dual-layer project, a single ".img" file contains the entire project, without any break point information.

If you select your hard disk drive as your output device, you will be asked where you want the format to be written to.

Important: The format files will require the same amount of space as the build's VIDEO_TS or HVDVD_TS folder plus any DVD-ROM content you have included. Be sure you have enough free hard disk space before clicking Format.

If you are formatting a dual-layer project and use either DDP or CMF as the output format, two folders are created—one for each layer. Each folder contains all the information required by a replicator. If you use .img as the output format, one file is created, even for dual-layer projects.

The Cutting Master Format

There are some features of the DVD specification that you cannot include on red laser DVD-R discs that you burn with your system. These features, which must be added by a replication facility, include:

- Copyright management (including CSS and Macrovision)
- Double-sided disc information

Traditionally, the only way to include these features on your replicated disc was to use a DLT drive. The Cutting Master Format (CMF) has been adapted to the DVD-R format so that now you can burn a DVD-R disc on your system and a replication facility can use that disc and include these features on the discs they make. CMF for DVD-R is only supported by authoring drives and media.

Not all replication facilities support CMF discs; be sure to check with them ahead of time. Also, discs formatted as CMF may not play correctly on all DVD players. Only use CMF when supplying a disc to a replication facility.

Important: Only a replicator can create DVDs with copyright management features. Using CMF discs allows you to format the data properly so that the replicator can add the copyright information.

Reading a DLT Drive

With DVD Studio Pro, you can copy the contents of a DLT drive to your hard disk as a disk image file. If the disk image is a single-layer project, you can then use the format feature to write the file to a second tape or to a DVD-R disc. By opening the disk image, you can access the VIDEO_TS or HVDVD_TS folder.

This technique can be useful if you want to verify the DLT tape's contents, make a backup of a DLT tape, or burn a DVD of a previous project without having to load the project and all its assets onto your system.

To read a DLT drive

1. Make sure the DLT drive is connected and the tape is inserted.
2. Click Read DLT in the toolbar.
3. Select the location for the tape's contents to be written to in the dialog that appears.
4. Click Open to start the process.

If the tapes are from a dual-layer project, you are prompted to insert the second tape once the first has been read. The contents of the second tape are appended to the first tape's contents.

Important: When you read from a DLT drive, the ".layout" file that DVD Studio Pro uses to track the copy protection settings, position of the dual-layer break point, and other format related settings is not available. This means that, for single-layer projects, you have to verify the settings in the format dialog before you burn a DVD or write a new DLT from the file. It also means that you cannot burn a DVD or write a new DLT of a dual-layer project.

Using Advanced Features

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DVD Studio Pro contains a number of advanced features that are used mostly in specialized projects: VTS Editor, DVD@CCESS, user operations, display conditions, remote control settings, and Line 21 settings. In most cases, these features are available in several elements, such as menus and tracks.

This chapter covers the following:

- VTS Editor (p. 591)
- DVD@CCESS (p. 598)
- User Operations (p. 602)
- Display Condition (p. 607)
- Remote Control Settings (p. 612)
- Line 21 Settings for Closed Captions (p. 614)

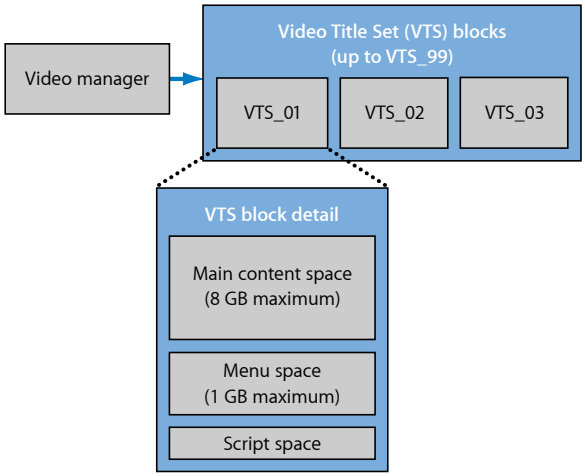
VTS Editor

The VTS Editor allows you to verify and control the VTS (Video Title Set) structure of your project. Using the VTS Editor, you are able to manually assign elements to VTS blocks. This makes it possible for you to optimize the final DVD's layout so that when it's played there are minimum pauses due to the player having to move between elements in different parts of the disc.

For most projects, the VTS assignments automatically made by DVD Studio Pro while you build your project will work fine. However, complicated or specialized projects using many scripts and menus can have their playback performance improved by manually moving elements between the VTS blocks.

About VTS Blocks

The contents of a video DVD are contained in one or more VTS blocks. In DVD Studio Pro, each track and slideshow must reside in its own VTS. Additionally, each VTS has a structure to support one or more menus and one or more scripts. Also, all DVDs have a video manager that knows the VTS structure of the disc.



Menus and VTS Blocks

All menus in a VTS must use the same video and audio settings, including formats, aspect ratios, resolutions, and in the case of audio, sample size. For example, if you have some menus using AIFF audio and others using AC-3, they must be placed in different VTS blocks. DVD Studio Pro automatically places menus into VTS blocks as needed by their assets.

Each VTS in an SD project is limited to a single file to hold the menu content, with a maximum file size of 1 GB. If you have a lot of motion menus, you may exceed this limit and need to split the menus between multiple VTS blocks.

Note: A single VTS in an HD project can contain up to 99 1 GB files for menus.

DVD Playback and VTS Blocks

When you play a DVD and a jump must occur, such as when a menu button is selected that jumps to a track's chapter marker, there is a slight pause while the DVD player's laser locates where to jump to on the disc.

- *If the track is in a different VTS block than the menu:* The laser must first jump to the video manager files, and from there on to the track's VTS.
- *If the track is in the same VTS block as the menu:* The laser is able to go directly to the track.

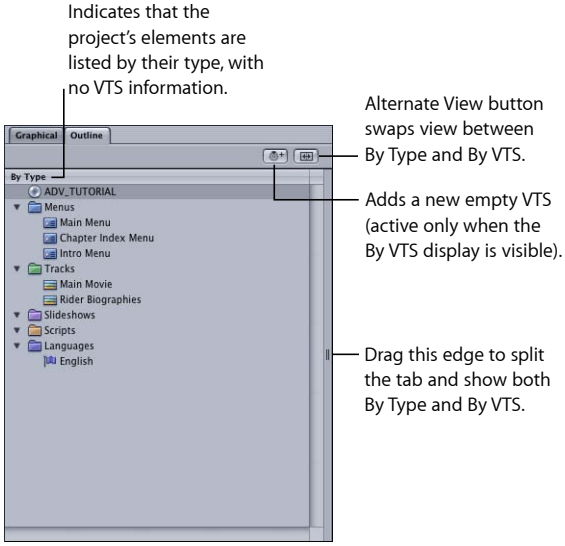
You can improve a disc's playback performance by keeping related elements together whenever possible. For example, you should place the scripts used with a specific track in the same VTS as the track.

Because menus often link to multiple tracks or slideshows, you will not be able to keep them together with everything they can jump to. However, you can minimize the time a DVD player spends jumping from the menu to the video manager files by keeping the menus in the first VTS, which is physically located close to the video manager files.

See Standard SD DVD Video Zone Files for more information.

Showing the VTS Editor

The VTS Editor is located in the Outline tab. By default, the VTS Editor is hidden in the Outline tab.

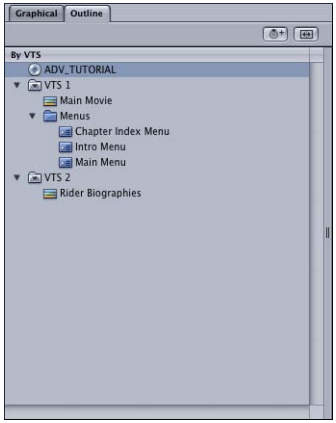


To show the VTS Editor

Do one of the following:

- Click the Alternate View button.

The Outline tab changes from the current display, either By Type or By VTS, to the alternate display. If the display is in a split-view mode (showing both By Type and By VTS), clicking the Alternate View button swaps sides between the two views.



- Drag the partition toward the tab's center.

  The partition edge can be on the left or right—it is the side that has the handle indication.

Comparing the By VTS and By Type Displays

The elements in the By VTS and By Type displays are very similar and can be used to do many of the same things. For example, double-clicking an element in either display opens it in its editor and inspector. (Selecting an element in one display also selects that same element in the other.)

The primary difference is in how they are organized.

- *By VTS:* Lists the elements based on the VTS they belong to. A VTS can have only one track (which can also have stories) or one slideshow, but it can have multiple menus and scripts.
- *By Type:* Lists the elements based on their type (menus, tracks, slideshows, and scripts). See Using the Outline Tab for more information on using the By Type display.

Note: The Languages section in the By Type display does not represent actual elements—it represents languages that can be used for the menus. It does not appear in the By VTS display because it is not specific to a VTS.

Moving Elements from One VTS to Another

You can move elements from one VTS to another by dragging. This is most often done to place scripts and menus in the same VTS blocks as the tracks or slideshows they most closely relate to.

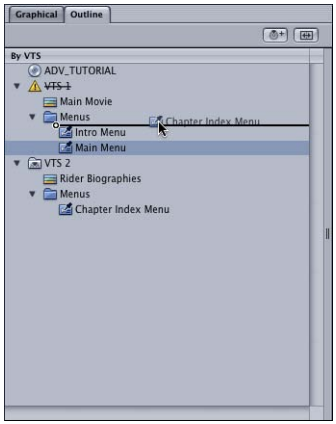
To move an element to a different VTS

- Select the element and drag it to the destination VTS block's name.

As you drag the element, a black box surrounds the VTS name that it will be moved to as you pass over it. Releasing the element places it in that VTS. The element has a "pin" added to its icon to indicate it has been manually placed in that VTS.

Once you start dragging the element, all incompatible VTS blocks (containing pinned incompatible menus) have their names struck through and yellow warning triangles placed in front of them. If you move a menu into an incompatible VTS, a warning appears, and the incompatible menus have a line through their names. See About Pinning Elements in the By VTS Display for more information.

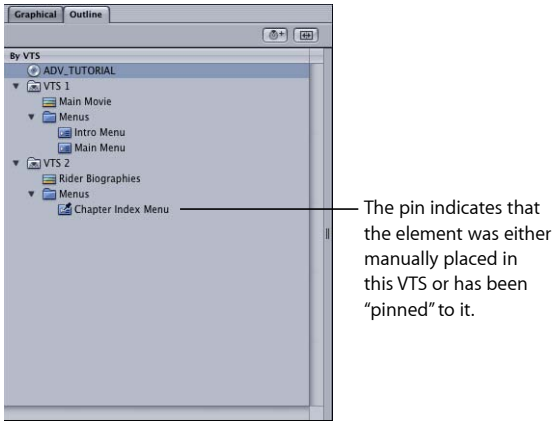
Important: It is possible to manually move incompatible menus to the same VTS. The project will not build, however.



About Pinning Elements in the By VTS Display

As you create elements for your DVD project, DVD Studio Pro automatically places them in appropriate VTS blocks. For example, if you create a menu that uses a different audio format than the others, it is automatically placed in a separate VTS.

If you manually move an element from one VTS to another, the VTS Editor indicates it with a pin on the element's icon.



You can also pin an element to a VTS to prevent DVD Studio Pro from moving it to another VTS.

To pin an element to a VTS

- Control-click the element in the By VTS display, then choose Pin Element Type to Video Title Set from the shortcut menu, with Element Type being the type of element being pinned (menu, script, and so on).

To unpin an element from a VTS

- Control-click the element in the By VTS display, then choose Pin Element Type to Video Title Set from the shortcut menu, with Element Type being the type of element being pinned (menu, script, and so on). (Because the element was pinned, it has a checkmark next to this entry in the shortcut menu.)

Once it is unpinned, the element is moved to the VTS where DVD Studio Pro would normally automatically place it.

Adding Additional VTS Blocks

You can add additional VTS blocks to your project as needed.

To add a VTS to your project

1. Ensure the By VTS display is visible by doing one of the following:
   - Click the Alternate View button.

- Drag the partition toward the center of the Outline tab.

2 Do one of the following:

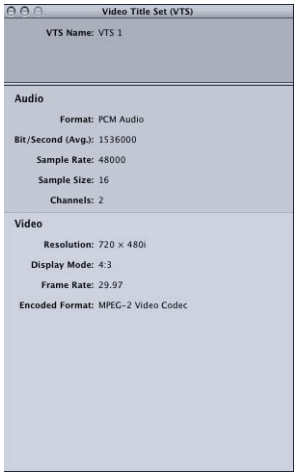
- Control-click in the By VTS display, then choose Add Video Title Set from the shortcut menu.
- Click the Add VTS button along the top of the Outline tab.

A project can have up to 99 VTS blocks. The actual number of VTS blocks you can have depends on the number of stories in your project. Even though stories do not get placed in their own actual VTS blocks (they share the VTS block that contains the track they are related to), they use virtual VTS blocks. For example, a project with five stories can have a maximum of 94 actual VTS blocks.

If any VTS blocks are empty when you build the project, you are asked if you want them to be deleted. While it does not violate compatibility with the DVD specification to have empty VTS blocks in the build, they do use a small amount of disc space. Additionally, each VTS block that does not contain a track or slideshow reduces by one the total number of tracks, slideshows, and stories your project can have.

VTS Inspector

You can see the properties of a VTS block by clicking its name in the VTS Editor.



The VTS Inspector shows the name of the VTS block and its audio and video properties. The properties are defined by the menus assigned to the VTS. If there are no menus in the VTS, these properties are left blank. It is these properties that determine whether or not any new menus that are added are compatible.

DVD@CCESS

The DVD@CCESS feature allows you to add additional interactivity to your DVD title when it is played on a computer. For example, you can set a marker so that when it is reached, the computer's web browser opens and is directed to the specified URL, which can be a website on the Internet or an HTML file on the DVD.

DVD@CCESS is compatible with both Macintosh computers and most Windows-based computers. See Configuring Computers for DVD@CCESS Playback for details on configuring both types of computers.

While the most common use of DVD@CCESS is to link to a website, you can also use it to open a program to view other types of files, such as PDF, PICT, or JPEG files. You can use DVD@CCESS links for:

- *Internet access:* You can enter a URL that links to a specific page on the Internet.
- *Opening a file:* You can enter a filename. As long as the file type can be recognized by the computer's operating system and a suitable application for that file type is available, the application opens and displays the file. Most often you will want to link to a file that you have included on the DVD.
- *Email:* You can enter an email address. The computer's default email application opens, creates a new email, and enters the address you specify as the recipient.

Creating DVD@CCESS Links in Your Project

There are three elements within DVD Studio Pro that can include DVD@CCESS links:

- *Menus:* Each menu can have a DVD@CCESS link. The link is activated as soon as the menu is displayed. While you cannot assign a DVD@CCESS link directly to a button, you can assign the link to a menu that appears only when you click that button.
- *Markers:* Each marker within a track can have a DVD@CCESS link. The link is activated as soon as you reach the marker while playing the track.
- *Slideshow slides:* Each slideshow slide can have a DVD@CCESS link. The link is activated as soon as the slide starts playing.

The DVD@CCESS settings appear in the Inspector of each element.

To enter a DVD@CCESS link

1. Select the item to add the link to.

   Its Inspector appears.

2. Select the DVD@CCESS checkbox to enable the link for the item.

3 In the Name field, enter text to help you remember what the DVD@CCESS link is for. This text is not seen by the viewer and is only for your use while authoring the title. It can be helpful because the link text is often difficult to interpret directly.

4 Enter the link text in the URL field. This is the text that gets processed during playback.

See Rules for Entering DVD@CCESS Links for guidelines on entering the links.

Note: The Embed Text Data checkbox in the Advanced tab in the Disc Inspector is automatically selected when you add DVD@CCESS links to your project.

Configuring a DVD@CCESS link to a file included on the DVD requires some additional steps.

To enter a DVD@CCESS link to a file on the DVD

1 Select the item to add the link to.

Its Inspector appears.

2 Select the DVD@CCESS checkbox to enable the link for the item.

3 In the Name field, enter text to help you remember what the DVD@CCESS link is for.

4 Enter the link text in the URL field. This is the text that gets processed during playback. To link to a file located on the DVD, you would enter:

file:///DVDName/FolderName/FileName

where DVDName is the name of the disc entered in the Disc Inspector, FolderName is the folder the file will be in on the DVD, and FileName is the file (the name must include an extension such as .pdf or .jpg).

5 Do one of the following to open the Disc Inspector:

- Click an empty area in the Graphical tab.
- Click the disc icon in the Outline tab.

6 Click the General tab in the Disc Inspector.

7 Select the Content checkbox.

8 Choose the folder that contains the folders and files you want to include on the DVD.

Note: The actual folder you choose is not included on the DVD—only the folders and files contained within it are added to the root level of the DVD.

Rules for Entering DVD@CCESS Links

Enter your links in the following format:

Note: The entry cannot contain any spaces.

- *Internet links:* Enter the entire link. For example:

  http://www.apple.com

- *File links:* To view a file you have placed in a folder on the DVD, enter:

  file:///DVDName/FolderName/FileName

  where DVDName is the name of the disc entered in the Disc Inspector, FolderName is the folder the file will be in on the DVD, and FileName is the file (the name may include an extension such as .pdf or .jpg).

  The file path information is case-sensitive. Be sure you enter it exactly right. Additionally, what you enter for FolderName is not the same folder you enter as the DVD-ROM Location in the General tab of the Disc Inspector—it is actually the name of the folder that is placed at the root of the disc. See DVD-ROM for more information.

  Important: Filenames and paths using double-byte characters may not work correctly on systems configured for single-byte characters.

- *Email links:* Enter the email link as:

  mailto:yourname@yourplace.com

Testing DVD@CCESS Links

It is important to test the DVD@CCESS links you add to your project before committing the title to replication. The Simulator and the Apple DVD Player application can test most DVD@CCESS functionality.

Using the Simulator

You can use the Simulator to test DVD@CCESS links that rely on Internet access or email; you can also see the text of each link when it is reached during playback in the Simulator's information drawer.

The Simulator pane in DVD Studio Pro Preferences contains a setting that allows the Simulator to process DVD@CCESS links. See Simulator Preferences for more information.

Using the Apple DVD Player

You can use the Apple DVD Player application to test DVD@CCESS links that rely on Internet access or email. You must first build your project, creating the VIDEO_TS folder that DVD Player can open and play.

Note: Be sure to select Enable DVD@CCESS Web Links in the Disc tab of DVD Player Preferences.

Testing DVD@CCESS Links to Files with the Apple DVD Player

Because the files you intend to include on the DVD for access by DVD@CCESS links are not in their actual locations until you create the DVD, you cannot test these links as easily as the others with the Apple DVD Player.

To test DVD@CCESS links that rely on opening files located on the DVD, you can either:

- *Build and format the title and burn it to a disc:* You can then test the disc on a variety of computers to verify that the links work as expected.

- *Build and format the title and write it as a disk image to your hard disk:* The disk image contains the specified DVD-ROM content in addition to the VIDEO_TS and AUDIO_TS folders. Using the Apple DVD Player, you can play the disk image as if it were a burned DVD, and the DVD@CCESS links that rely on the DVD-ROM files can be tested.

Configuring Computers for DVD@CCESS Playback

Any DVD discs burned by DVD Studio Pro that include DVD@CCESS links also include an Installer for a small program that allows Windows computers to process the links. This program needs to be installed only once on a computer—it is not specific to that DVD title and will work with all DVD titles that use DVD@CCESS.

The Installer is located on the DVD in the DVD@CCESS folder, along with installation instructions.

Macintosh Computers

In the Apple DVD Player version 2.4 and later, DVD@CCESS playback functionality is built in.

When using version 2.4 or later of the Apple DVD Player, you need to configure it to process the links. Select Enable DVD@CCESS Web Links in the Disc tab in DVD Player Preferences.

Windows Computers

The DVD@CCESS Installer for Windows installs a program that works with most DVD player applications and Windows computers to process the DVD@CCESS links in the DVD title. See DVD Studio Pro Late-Breaking News, accessible through DVD Studio Pro Help, for specific information on known issues.

Including the DVD@CCESS Installer with a DVD

The DVD@CCESS Installer is automatically added to a DVD when you burn it directly from DVD Studio Pro.

When you need to burn your DVD using another method, the Installer is not automatically added. You can manually add the Installer to the disc by copying it from the DVD Studio Pro application package.

Important: Be very careful when working within the DVD Studio Pro package. You can easily corrupt the data, lose custom settings, and be forced to reinstall DVD Studio Pro. This procedure should only be followed if you understand the concept of opening an application's package and working within it.

To copy the DVD@CCESS Installer manually

1 Locate the DVD Studio Pro application icon in your computer's Applications folder. (This is the default location; the application may be located elsewhere depending on how it was installed.)

2 Control-click the icon, then choose Show Package Contents from the shortcut menu.

The package opens in a Finder window.

3 Open the Contents folder, then the Resources folder. The DVDccess folder is in the Resources folder.

4 Copy the DVDccess folder to your desktop by holding down the Option key and dragging. This leaves the original in place and makes a copy you can add to your DVD.

5 Close the package's Finder window.

User Operations

You can disable various viewer operations in menus, tracks, stories, and markers. For example, you may want to prevent the viewer from skipping through the FBI warning.

By providing this ability for individual menus, tracks, stories, and markers, DVD Studio Pro allows you to be very specific about which elements have disabled operations.

Setting User Operations

To disable specific viewer controls for a menu, track, story, or marker, use the user operations settings.

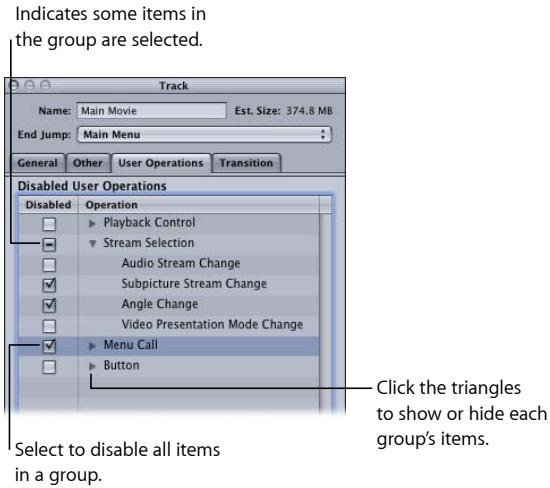
Note: Selecting an item in the User Operations tab *disables* that item. Selecting an item does not enable it.

To set user operations

1 Select the element you want to work with to display its properties in the Inspector.

2 Click the User Operations tab in the Track, Marker, or Story Inspector or the Advanced tab in the Menu Inspector.

3 Select each item you want to disable. See User Operations Properties for a description of all the items.



You can also click Disable All to disable all items. You can then deselect any items to enable them. The Enable All button enables all items.

When working with markers, you can also select Same as Track. This allows you to customize just those markers that require it.

User Operations Properties

The user operations are broken into four groups: Playback Control, Stream Selection, Menu Call, and Button. The following sections describe what happens when you select each item.

Playback Control

The Playback Control group contains the following settings.

- *Title Play:* Available only in tracks, menus, and stories. Prevents jumping to a different title by entering a title number using a DVD player remote control.
- *PPT Search/PTT Play:* Available only in tracks. Prevents jumping to or playing from a new chapter marker by using a remote control's numeric keypad. PTT stands for*part of title*and corresponds to track sections defined by markers.
- *Time Search/Time Play:* Available only in tracks. Prevents jumping to or playing from a new time by using a remote control's numeric keypad.
- *Stop:* Available in tracks, menus, stories, and markers. Prevents stopping movie playback before the end of the movie while a selected menu is displayed or until the next track, marker, or story is reached.
- *Resume:* Available only in menus. Prevents resuming movie playback while a selected menu is displayed or until the next track, marker, or story is reached.
- *Time/PTT Search:* Available only in tracks and markers. Prevents locating specific points in a video stream by entering an exact time.
- *Still Off:* Available in tracks, menus, stories, and markers. By default, disabled in menus. Disables the ability to prevent a still image from stopping in a slideshow. In other words, allows a still image to be paused.
- *Pause On/Off:* Available in tracks, menus, stories, and markers. By default, disabled in menus. Disables the pause on/off function during track playback until the next track, marker, or story is reached.
- *Forward Scan:* Available in tracks, menus, stories, and markers. By default, disabled in menus. Prevents scanning forward through the disc.

- *Backward Scan:* Available in tracks, menus, stories, and markers. By default, disabled in menus. Prevents scanning backward through the disc.
- *Next Program:* Available in tracks, menus, stories, and markers. By default, disabled in menus. Prevents skipping forward through chapters.
- *Previous Program:* Available in tracks, menus, stories, and markers. By default, disabled in menus. Prevents skipping backward through chapters.
- *Go Up:* Available only in menus. Prevents using the Return button on a remote control.

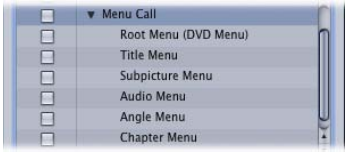
Stream Selection

All items available in tracks, menus, stories, and markers.

- *Audio Stream Change:* Prevents changing to an alternate audio track during movie playback until the next track, marker, or story is reached.
- *Subpicture Stream Change:* Prevents viewing an alternate subpicture stream (another name for the subtitle stream).
- *Angle Change:* Prevents viewing different camera angles of the same material.
- *Video Presentation Mode Change:* Prevents switching between 4:3 and 16:9 aspect ratios or switching between pan-scan and letterbox presentations.

Menu Call

All items available in tracks, menus, stories, and markers.



- *Root Menu (DVD Menu):* Prevents using the Menu button on a remote control to access a DVD menu that you have previously set up in the Connections tab.
- *Title Menu:* Prevents using the Title button on a remote control to access a DVD menu that you have previously set up in the Connections tab.
- *Subpicture Menu:* Prevents accessing the subtitle menu during movie playback.
- *Audio Menu:* Prevents accessing the audio menu during movie playback.
- *Angle Menu:* Prevents accessing the angle menu during movie playback.
- *Chapter Menu:* Prevents accessing the chapter menu during movie playback.

Button

There is only one item in the Button group.

- *Selection/Activation:* Available only in tracks, menus, and stories. Prevents selecting and activating button highlight areas.

Getting Consistent Previous and Next Button Behavior

The action that happens when a viewer uses the Previous or Next button to skip through chapter markers on a track and reaches the first or last marker can vary, depending on the DVD player. For example, if the viewer is at the last marker in a track and presses the Next button one more time, different DVD players will do different things. There are two common approaches that DVD players take:

- *The viewer is constrained to that track:* Additionally, the Previous or Next button (depending on whether you have reached the first or last marker, respectively) is disabled.
- *The viewer is not constrained to that track:* Additionally, the DVD player jumps to the previous or next track (which could also be a story or slideshow) and allows the viewer to continue skipping through that track's markers.

You can use user operations to force consistent behavior in these situations, ensuring that the viewer has the same experience regardless of which player they are using.

To ensure consistent Previous and Next button behavior

1. Select a track in either the Outline or Graphical tab, or in the Track Editor.
2. Select the first marker in the Track Editor.

   The Marker Inspector appears, displaying that marker's properties.
3. Click the User Operations tab.
4. Select the Previous Program checkbox.

   This disables the remote control's Previous button for this marker, which prevents the viewer from skipping to a marker on a different track.
5. Select the last marker in the track.

   The Marker Inspector now displays that marker's properties.
6. Click the User Operations tab.
7. Select the Next Program checkbox.

   This disables the remote control's Next button for this marker, which prevents the viewer from skipping to a marker on a different track.

Note: The same issue can occur with slideshows; however, you cannot correct it unless you convert the slideshow to a track.

Display Condition

The menus, tracks, and stories within DVD Studio Pro can have a display condition applied to them that determines whether they appear, and if not, what should appear instead. For example, based on the DVD player's aspect ratio setting, the condition can determine whether to play the current track or a track that is better suited to the aspect ratio setting. Or, you can choose to show or not show a menu based on the language setting.

By assigning a pre-script to the element or running a script before it is selected, you can include settings in the General Purpose Register Memories (GPRMs) as part of the condition. See Scripting Overview for information on setting up scripts.

Comparing Display Conditions and Pre-Scripts

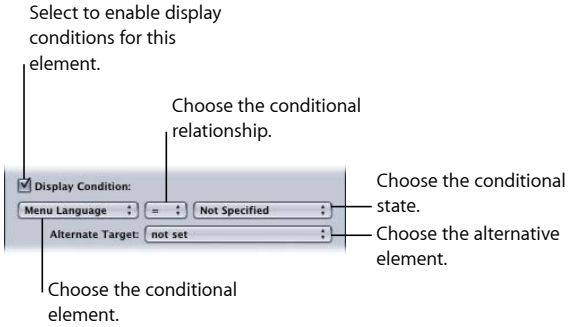
All three elements (menus, tracks, and stories) that can have display conditions can also have pre-scripts. Pre-scripts are scripts that are assigned to an element. They can do everything a display condition can do and more. There are some specific differences to be aware of:

- When an element has both a pre-script and a display condition, the pre-script executes first.
- Pre-scripts only execute if you have jumped to the root of the element they are assigned to, either by choosing the element's name in the Connections tab or the name in square brackets in the shortcut menus. If you connect directly to a marker, slide, or menu button, the pre-script does not run. Display conditions, however, run any time the element it is assigned to is jumped to, whether you jump to its root or to a specific marker, slide, or button.
- On the DVD, pre-scripts are automatically placed with all other scripts in the VTS 1 file group. This can cause slight delays when executing them because the DVD player may have to jump significant distances to get to and from the script. Display conditions reside in the same file groups as the element they are assigned to, which makes them more efficient when playing.

  Note: You can use the VTS Editor to manually place pre-scripts in the same VTS block as the element it is assigned to. See VTS Editor for more information.

Display Condition Parameters

There are four parameters you need to configure when setting up a display condition:



- *The conditional element:* You choose what is to be evaluated to determine whether the menu, track, or story should be displayed. Examples of what you can choose include the DVD player's region code, aspect ratio, or the contents of a GPRM.

  Note: Display conditions can only use full 16-bit GPRMs.

- *The conditional relationship:* You choose the operation to use to determine the relationship between the conditional element and the conditional state. Example settings include smaller, greater, and equal.
- *The conditional state selection:* You choose the state of the conditional element. The choices depend on the conditional element. For example, the states for the player region code element are the eight regions (1 USA, 2 Europe, Japan, 3 Indonesia, Taiwan, and so on).
- *The alternative target selection:* You choose the project element (menu, track, story, and so on) that should be displayed if the condition is not satisfied.

Important: You must set all four parameters or else errors will occur during the build process.

When setting display conditions for a track, there is an additional checkbox named Apply to Stories. Select it to have the display condition apply to the stories associated with this track.

Setting Up a Display Condition

You need to set four parameters to create a display condition.

To set up a display condition

1. Choose the element (menu, track, or story) to set up a display condition for.
2. Do one of the following:
   - *If you are setting up a menu:* Click the Advanced tab in the Menu Inspector.
   - *If you are setting up a track or story:* Click the General tab in the Track or Story Inspector.

3 Select the Display Condition checkbox.

4 Choose the conditional element (the first parameter—defines what the condition is to be based on). For a list of conditional elements you can use, see Conditional Elements and States.

5 Choose the conditional relationship (the second parameter—determines how the conditional element is to be compared with the conditional state, set in the next step). For a list of conditional relationships, see Conditional Relationships.

6 Choose the conditional element's state (the third parameter—defines the state that the conditional element is to be compared to). See Conditional Elements and States for the states you can choose for each element.

7 Choose the Alternate Target element (the fourth parameter—defines what happens if the condition is not met).

To turn off the display condition, select the Display Condition checkbox to remove the checkmark.

Stories can have their own display conditions, or you can use the track's settings by selecting Apply to Stories in the Track Inspector's General tab.

Example: Setting a Video Configuration Display Condition

For this example, you have a project with two versions of a track; one has the buttons over video optimized for pan-scan and the other has them optimized for letterbox. This display condition will use the video configuration information (SPRM 14) to choose which version to play.

To configure a video configuration display condition for a track

1 Choose the track containing the pan-scan optimized video.

2 Click the General tab in the Track Inspector.

3 Select the Display Condition checkbox.

4 Choose Video Player Config from the conditional element pop-up menu.

5 Choose = (equal) from the conditional relationship pop-up menu.

6 Enter 256 as the conditional state.

This is the value for SPRM 14 that indicates the DVD player is set for pan-scan. See SPRM 14: Player Video Configuration for more information.

7 Choose the track, optimized for letterbox, that you want to use as the alternative to this track from the Alternate Target pop-up menu.

With this display condition, the video configuration of the DVD player is checked to see if it is set at pan-scan. If it is, the track plays. If not, the player jumps to the letterbox track and it is played.

Conditional Elements and States

The conditional elements are based on settings read from the System Parameter Register Memories (SPRMs) or the General Purpose Register Memories (GPRMs).

The conditional states are determined by the element. For example, the menu language element has all supported languages as the possible states. If the state is a numeric entry, you need to enter a decimal-based number (binary and hex numbers are not supported).

- *Menu Language:* Use to set up a condition based on the DVD player's menu language setting (SPRM 0). The states include all supported languages.
- *Audio Language:* Use to set up a condition based on the DVD player's audio language setting (SPRM 16). The states include all supported languages.
- *Subtitle Language:* Use to set up a condition based on the DVD player's subtitle language setting (SPRM 18). The states include all supported languages.
- *Audio Stream Number:* Use to set up a condition based on the currently selected audio stream (SPRM 1). The states include audio stream numbers 1 through 8. "Not set" appears next to any streams that currently have no assets assigned.
- *Subtitle Stream Number:* Use to set up a condition based on the currently selected subtitle stream (SPRM 2). The states include subtitle stream numbers 1 through 32. "Not set" appears next to any streams that currently have no subtitles assigned.
- *Player Aspect Ratio:* Use to set up a condition based on the DVD player's aspect ratio setting (4:3 or 16:9—bits 8 and 9 of SPRM 14). The states include 4:3, 16:9 Pan-Scan, 16:9 Letterbox, and 16:9 Pan-Scan and Letterbox.
- *Last Track Played:* Use to set up a condition based on the most recently played track (SPRM 4). The states include all track numbers in the project.
- *Last Chapter Played:* Use to set up a condition based on the most recently played chapter (SPRM 7). The states include all chapter marker numbers in the track.
- *Last Button Selected:* Use to set up a condition based on the most recently selected button (SPRM 8). The states include numbers 1 through 36.
- *Player Region Code:* Use to set up a condition based on the DVD player's region setting (SPRM 20). The states include all eight regions.
- *Parental Level:* Use to set up a condition based on the DVD player's parental level setting (SPRM 13). The states include all eight parental levels plus a Not Rated setting.

  Important: DVD players will always set SPRM 13 to Not Rated when playing DVDs authored with DVD Studio Pro.
- *Video Player Config:* Use to set up a condition based on the DVD player's aspect ratio setting (4:3 or 16:9) and display mode (letterbox or pan-scan) (SPRM 14). The state requires a decimal number entry.

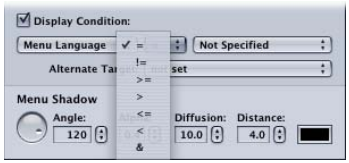
- *Audio Player Config:* Use to set up a condition based on the DVD player's audio configuration—PCM, AC-3, and MPEG (SPRM 15). The state requires a decimal number entry.
- *GPRM 0 - 7:* Use to set up a condition based on the values stored in one of the eight GPRM locations. The values must first be placed into the GPRM by a separate script that you have run. The state requires a decimal number entry.

  Note: Display conditions can only use full 16-bit GPRMs.

See Scripting Overview for details on scripts, GPRMs, and SPRMs.

Conditional Relationships

There are seven conditional relationships for you to choose from when setting up your display condition.



- *= (equal):* The element and state are exactly equal. For example, if you choose the Player Region Code element, a state of 1-USA, and the "equal" relationship, you can only play the track if the DVD player is set for region 1-USA.
- *!= (not equal):* The element and state are not exactly equal. For example, if you choose the Audio Language element, a state of French, and the "not equal" relationship, you can play the track as long as the DVD player is not set for French.
- *> = (greater or equal):* The element is either greater than the state, or they are equal. For example, if you choose the Parental Level element, a state of PG-13, and "greater or equal," you can play the track as long as the DVD player is set to PG-13 or higher (R or NC-17).
- *> (greater):* The element is greater than the state. For example, if you choose the Audio Stream Number element, a state of 2, and "greater," you can play the track as long as one of the two first audio streams is not selected.
- *<= (smaller or equal):* The element is either less than the state, or they are equal. For example, if you choose the Last Track Played element, set the state to 12, and "smaller or equal," you can play this track as long as the previous track is from 1 to 12.
- *< (smaller):* The element is less than the state. For example, if you choose the Subtitle Stream Number element, set the state to 4, and "smaller," you can play this track as long as subtitle streams 1 through 3 are selected.

- *& (and):* Provides a binary bit-wise "and" function. Several of the elements contain multiple settings. You can use the "and" relationship to extract one setting from the element. For example, if you choose the Audio Player Config element (which contains several settings related to the DVD player's audio capabilities), a state of 2048-DTS, and the "and" relationship, you can only play the track if bit 11 of the 16-bit byte is one, indicating that the DVD player supports DTS audio. See Using Bit-Wise Operations for details on using a bit-wise "and" function.

Issues with Display Conditions

There are several issues with using display conditions that you should be aware of:

- *The Last Chapter Played setting is reliable only when assigned to menus:* When using the Last Chapter Played setting for display conditions assigned to a track or story, you get unreliable playback on some DVD players. The Last Chapter Played setting can be used reliably with display conditions assigned to menus.
- *Display Conditions using the subtitle stream number only work with the subtitle stream set to View:* When you configure a display condition for a track or story that uses the subtitle stream number option, the display condition works correctly only if the subtitle stream is set to be viewed. For example, if you configure a menu's button to use subtitle stream S1 and a track has a display condition configured for subtitle stream S1, the display condition only works correctly if you also select the subtitle stream's View checkbox in the Button Inspector.
- *Some DVD players do not allow parental level in display conditions:* Some DVD players do not process the parental level option correctly when used in a display condition, allowing content to play that should be disallowed.

  Important: DVD players always set SPRM 13 to Not Rated when playing DVDs authored with DVD Studio Pro.

Remote Control Settings

An important part of authoring a DVD title is to assign functions to the DVD player's remote control buttons. For most projects, you set these functions for the entire disc. However, you can override several of the disc settings for individual tracks, stories, markers, slideshows, and menus.

If an individual element has more than one remote control setting:

- Track, slideshow, story, and menu settings take precedence over disc settings while they play.
- Marker settings override all other settings while that part of the track or story plays.

Note: All of these settings can also all be made in the Connections tab.

Remote Control Buttons

The disc's remote control settings support seven buttons. Remote control settings for tracks, stories, markers, slideshows, and menus support only certain ones:

- *Title:* Supported by the disc settings only. This button is typically linked to the primary menu so that, no matter where the viewers are in the title, when they press the Title button they will always go to the same place.
- *Menu:* Supported by all elements that can set remote control settings (disc, track, story, marker, and slideshow) except menus. You should generally link this button to the last menu viewed.
- *Angle:* Supported by the disc, track, and slideshow elements. You can link this button to a menu that allows the viewer to select the angle to view.
- *Chapter:* Supported by the disc, track, and slideshow elements. Typically found only on specialized DVD players, you can link this button to a menu that allows the viewer to select the chapter to view.
- *Audio:* Supported by the disc, track, and slideshow elements. You can link the Audio button to a menu that allows the viewer to select the audio stream to listen to.
- *Subtitle:* Supported by the disc, track, and slideshow elements. You can link this button to a menu that allows the viewer to select whether subtitles appear and the subtitle stream to view.
- *Return:* Supported by the disc and menu settings only. The Return button is usually used to provide an easy way for the viewer to navigate back through nested menus.

Beware of Similar-Sounding Buttons

The remote controls of most DVD players include stream select buttons labeled Angle, Audio, and Subtitle. These are not the same as the remote control buttons you can assign menus to. These three buttons allow the viewer to directly select the angle, audio, and subtitle stream without going to a menu first.

The Angle, Chapter, Audio, and Subtitle remote control buttons that you can assign menus to are in addition to these three stream select buttons, and are found only on a few remote controls, typically grouped in a "Menus" section of the remote control.

It is important to include alternative methods for viewers to get to these menus. You cannot count on all remote controls to have these buttons.

Configuring the Remote Control Buttons

You can configure the remote control buttons either in the Inspector or in the Connections tab.

To set the remote control buttons using the Inspector

1 Select the element whose remote control buttons you want to set. You can select the element in the Outline tab, the Graphical tab, or use the pop-up menu in the appropriate editor.

2 In the Inspector, open the pop-up menu for the button to be set, then choose the function to link to. All elements currently set in the project are available to be linked to.

The remote control settings are in different Inspector locations for different elements:

- *Disc Inspector:* The commonly used remote control settings (Title, Menu, and Return) are in the General tab. The Advanced tab contains the settings that are not often used (Angle, Chapter, Audio, and Subtitle).
- *Track, Story, and Marker Inspectors:* All remote control settings are in their General tabs.
- *Slideshow and Story Marker Inspectors:* All remote control settings are in its main area (there are no tabs).
- *Menu Inspector:* Its only remote control setting (Return) is in its Menu tab.

To set the remote control buttons using the Connections tab

1 Click the Connections tab. You can see all source elements in the project together, or see one element at a time:

- *To see the remote control buttons for all project elements at once:* Select the disc in the Outline tab or click an empty area in the Graphical tab.
- *To see the remote control buttons for a single element:* Select that element in the Outline tab, the Graphical tab, or use the pop-up menu in the appropriate editor.

2 Use the View pop-up menu in the Connections tab to control which of the remote buttons are visible:

- *Basic:* Shows the disc's title button, and the track's, story's, and slideshow's menu buttons.
- *Standard:* Shows all basic buttons plus menu buttons for a track's markers.
- *Advanced:* Shows all possible remote buttons.

3 Set the link for the remote button by either dragging the target to the source element or Control-clicking the button's setting in the Target column, and choosing the element to link to from the shortcut menu.

Line 21 Settings for Closed Captions

To add text to a video on a DVD, most users use the subtitle feature. To meet accessibility requirements, however, you may also need to consider closed captions.

Note: The closed caption settings apply only to NTSC SD DVD projects.

About Subtitles and Closed Captions

Subtitles have several advantages: You can create them within DVD Studio Pro or using a third-party subtitle authoring application, you can set their font and color, and they can be displayed by any DVD player. Closed captions offer other advantages.

Subtitles generally provide a text version of the dialogue only—they do not describe any other sounds that may be in the title (such as a dog barking or a phone ringing). Closed captions typically include descriptive text along with the dialogue, which makes them better suited for viewers with impaired hearing.

You can add descriptive text to subtitles and make them more similar to the content of closed captions, and there are third-party programs that will convert closed captions to a suitable subtitle format.

Closed captions require a decoder for playback. The decoder can be built in to the television or it can be a standalone box. Computers typically do not have closed caption decoders, so they cannot display captions. The font used by closed captions is determined by the decoder.

Adding Closed Captions to a DVD

With DVD Studio Pro, you can import closed caption files as part of a track. This is the most reliable way to include closed captions with your title.

Do not assume that just because the closed-captioning information was present in the video during the MPEG encode that it will be available when the disc is played by the viewer. Be sure to perform a test before relying on this method of adding closed captions to your title.

Some MPEG encoders can create separate closed caption files that DVD Studio Pro can use to add the function to your disc.

DVD Studio Pro supports closed caption files in the ".cc" and ".scc" formats.

About the Field 1 and Field 2 Settings

The closed caption standard provides for encoding up to four caption streams in Line 21. The two most commonly used streams (C1 and C2) use field 1, and the other two streams (C3 and C4) use field 2.

A closed caption file assigned to a track in DVD Studio Pro can have captions only in field 1 (C1 and C2) or in both fields (support for all four streams). It is important for you to configure the track's Line 21 settings to match the file's configuration.

Note: Because the C3 and C4 streams are rarely used, you may assume the closed caption file contains only the C1 and C2 streams, and only supports field 1. Be sure to verify this with a test disc and a DVD player connected to a television monitor before sending your disc to a replicator.

To assign a closed caption file to a track

1. Select the track so that it appears in the Track Editor and its properties appear in the Inspector.
2. Click the Other tab in the Track Inspector.
3. To choose the closed caption file, do one of the following:
   - In the Closed Caption (Line 21) area, click Choose. In the navigation dialog, locate and select the closed caption file to assign to this track. Click Choose.
   - Control-click in the Track Editor's video stream, then choose Import Line 21 File from the shortcut menu. Locate the closed caption file in the navigation dialog and click Import.

4. Select the Field 1 and Field 2 boxes to match the configuration of the caption file.

   Note: Most often you should select Field 1 and leave Field 2 unselected.

   You can only assign one file to a track.

Keyboard Shortcuts

A

Appendix

Keyboard shortcuts let you perform commands in DVD Studio Pro using the keyboard instead of by pointing and clicking. The following are keyboard shortcuts available in DVD Studio Pro, grouped by function.

Note: Some keyboard shortcuts are always active, whether or not you are working in the group that they are listed in. Other keyboard shortcuts are only active under special circumstances.

This appendix covers the following:

- General Interface and Application Controls (p. 618)
- General Project Controls (p. 619)
- Adding Project Elements (p. 620)
- Scrolling Through Lists (p. 621)
- Assets Tab (p. 622)
- Connections Tab (p. 622)
- Graphical Tab (p. 623)
- Log Tab (p. 624)
- Menu Tab (Menu Editor) (p. 624)
- Outline Tab (p. 626)
- Palette (p. 627)
- Script Tab (Script Editor) (p. 627)
- Simulator (p. 627)
- Slideshow Tab (Slideshow Editor) (p. 628)
- Story Tab (Story Editor) (p. 628)
- Subtitle Editor (p. 628)
- Track Tab (Track Editor) (p. 629)
- Viewer Tab (p. 631)

General Interface and Application Controls

Keyboard shortcut	Function
Function keys F1 through F15.	Opens the first 15 interface configurations, with F1 assigned to the basic configuration, F2 assigned to the extended configuration, and F3 assigned to the advanced configuration. F4 through F15 can be assigned to your custom configurations. (Note that F9, F10, and F11 may be used by Mac OS X for the Exposé feature, and F14 and F15 may be used to control the monitor's brightness.)
⌘ + 0	Accesses the Viewer tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + 1	Accesses the Assets tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + 2	Accesses the Connections tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + 3	Accesses the Log tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + 4	Accesses the Menu tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + 5	Accesses the Outline tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + option + 5	Accesses the Graphical tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + 6	Accesses the Script tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.

Keyboard shortcut	Function
⌘ + 7	Accesses the Slideshow tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + 8	Accesses the Story tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
⌘ + 9	Accesses the Track tab. This tab is brought to the front of its quadrant or, if in its own window, it's brought to the front of the application. If the tab is closed, it's opened as a window at its last position.
shift + space	Toggles the currently selected tab between full window and normal. Additionally, holding down the Shift and Space bar keys toggles the tab only until you release them.
⌘ + option + ,	Toggles the currently selected tab between full window and normal. Additionally, holding down the Shift and Space bar keys toggles the tab only until you release them.
⌘ + option + P	Shows or hides the Palette.
⌘ + option + I	Shows or hides the Inspector.
⌘ + T	Opens or closes the Fonts window.
⌘ + shift + C	Opens or closes the Colors window.
⌘ + ,	Opens Preferences.
⌘ + shift + ?	Opens DVD Studio Pro Help.
⌘ + Q	Quits DVD Studio Pro.
⌘ + M	Minimizes DVD Studio Pro.
⌘ + H	Hides DVD Studio Pro.

General Project Controls

Keyboard shortcut	Function
⌘ + Z	Undoes the last change.

Keyboard shortcut	Function
⌘ + shift + Z	Redoes a change you just undid.
⌘ + N	Creates a new project.
⌘ + O	Opens an existing project.
⌘ + W	Closes the project.
⌘ + S	Saves the project.
⌘ + shift + S	Saves a project as a new project.
⌘ + C	Copies the selected text, menu item, script command line, or subtitle button to the Clipboard. This shortcut works with both text in your menus and subtitles and element names.
⌘ + X	Copies the selected text, menu item, script command line, or subtitle button to the Clipboard and deletes it from selection. This shortcut works with both text in your menus and subtitles and element names.
⌘ + V	Pastes the Clipboard contents. This shortcut works with both text in your menus and subtitles and element names.
⌘ + D	Duplicates the selected item.
⌘ + option + 0	Simulates a project from the current element or, if none are selected, from the project's First Play setting.
⌘ + option + B	Burns the project.
⌘ + option + C	Builds the project.
⌘ + F	Formats the project.
⌘ + option + F	Builds and formats the project.

Adding Project Elements

Keyboard shortcut	Function
⌘ + control + T	Adds a track.
⌘ + shift + T	Adds a story.

Keyboard shortcut	Function
⌘ + Y	Adds a standard menu.
⌘ + shift + Y	Adds a layered menu.
⌘ + K	Adds a slideshow.
⌘ + ,	Adds a script.
⌘ + /	Adds a menu language.

Scrolling Through Lists

Lists in DVD Studio Pro are found in the Assets, Log, Outline, Connections, Slideshow, Script, and Story tabs.

Keyboard shortcut	Function
Drag scroller.	Scrolls through the list.
Press Option and drag scroller.	Scrolls slowly through the list (useful for large lists).
↑	Selects the previous line in the list.
↓	Selects the next line in the list.
shift + ↑	Selects the previous line in the list, leaving the current line selected.
shift + ↓	Selects the next line in the list, leaving the current line selected.
option + ↑	Goes to the top of the list.
option + ↓	Goes to the bottom of the list.
page up	Scrolls up one page in the list.
Press Option and click scroller's up arrow.	Scrolls up one page in the list.
page down	Scrolls down one page in the list.
Press Option and click scroller's down arrow.	Scrolls down one page in the list.

Assets Tab

Keyboard shortcut	Function
Double-click empty area.	Imports an asset.
⌘ + shift + I	Imports an asset.
Double-click asset name.	Previews the selected asset.
space	Previews the selected asset.
⌘ + A	Selects all assets and folders.
⌘ + shift + A	Deselects all assets and folders.
delete	Removes the selected asset.
⌘ + shift + N	Creates a new folder.
⌘ + E	Shows the encoder settings for the selected QuickTime movie.
Press Command and drag.	Does the opposite of the "Find matching audio when dragging" preference, used when you drag a video asset to a project element. You must start dragging the video asset before pressing the Command key.

Connections Tab

Keyboard shortcut	Function
control + ↑	Scrolls up through items in the list not currently selected.
control + ↓	Scrolls down through items in the list not currently selected.
Double-click.	Connects or disconnects the currently selected items.
return	Connects or disconnects the currently selected items.
delete	Disconnects the selected source's connection.
enter	Connects the selected source to the selected target and moves down to the next source or target (whichever was last selected).
Drag source's target setting.	Copies a source's target setting to another source.
Press Control and click separator.	Switches between horizontal and vertical views.

Graphical Tab

Keyboard shortcut	Function
shift + Z	Fits the tiles to the current window size.
⌘ + =	Zooms one step in while maintaining the current center.
⌘ + -	Zooms one step out while maintaining the current center.
Press Z and click in window.	Zooms one step into the area you click.
Press Option-Z and click in window.	Zooms out one step from the area you click.
Press Z and drag.	Zooms into the selected area.
Press Space bar and drag.	Repositions the tile area in the window.
M	Toggles macro view on and off. Additionally, you can hold down the key to temporarily show the macro view.
F	Toggles a tile's flag on and off.
Click tile and hold it.	After a short pause, a ghost image of the tile appears that you can drag to the Menu Editor to link to an existing button or to create a new button linking to this tile.
Click tile.	Selects the tile. Deselects any currently selected tiles first.
Press Shift and click tile.	Selects the tile. Retains any currently selected tiles.
Press Command and click tile.	Selects the tile. Retains any currently selected tiles.
⌘ + A	Selects all tiles.
⌘ + shift + A	Deselects all tiles.
↑	Moves the selected tiles up.
↓	Moves the selected tiles down.
←	Moves the selected tiles left.
→	Moves the selected tiles right.
Drag tile, then press Z.	Temporarily zooms out to show more of the tile area.
L	Toggles the tile position lock on and off.
⌘ + P	Prints the Graphical tab.

Log Tab

Keyboard shortcut	Function
⌘ + C	Copies the selected text.
⌘ + A	Selects all text.

Menu Tab (Menu Editor)

Keyboard shortcut	Function
Press Option and drag.	Creates a duplicate of the selected item.
⌘ + D	Creates a duplicate of the selected item.
Drag.	Creates a button.
Press Option and drag.	Creates a drop zone.
Press Command and drag.	Selects multiple items. Deselects any currently selected items first.
Press Command-Shift and drag.	Selects multiple items. Retains any currently selected items.
⌘ + A	Selects all menu items.
⌘ + shift + A	Deselects all menu items.
Double-click.	Creates a text object.
Press Command-Option and drag.	Creates a text object.
⌘ + B	Applies a bold attribute to the selected text.
⌘ + I	Applies an italic attribute to the selected text.
⌘ + U	Adds an underline to the selected text.
⌘ + shift + {	Left aligns the selected text.
⌘ + shift + |	Center aligns the selected text.
⌘ + shift + }	Right aligns the selected text.
Press Return while typing text.	Creates a new line. Applies to button text and text objects.
Press Enter while typing text.	While typing text into the Menu Editor, exits text entry mode. While typing text in the Button or Text Object Inspector, creates a new line.

Keyboard shortcut	Function
delete	Deletes the selected item.
Press Shift-Option and drag.	Repositions an asset in a drop zone or button (if possible).
Press Shift and drag.	Forces a button or drop zone to match its asset's aspect ratio, and maintains that aspect ratio while being resized.
↑	Moves the selected item up 1 pixel.
↓	Moves the selected item down 1 pixel.
←	Moves the selected item left 1 pixel.
→	Moves the selected item right 1 pixel.
shift + ↑	Moves the selected item up 10 pixels.
shift + ↓	Moves the selected item down 10 pixels.
shift + ←	Moves the selected item left 10 pixels.
shift + →	Moves the selected item right 10 pixels.
shift + option + ↑	Moves the selected item up 20 pixels.
shift + option + ↓	Moves the selected item down 20 pixels.
shift + option + ←	Moves the selected item left 20 pixels.
shift + option + →	Moves the selected item right 20 pixels.
⌘ + option + Y	Creates a submenu and adds a button to link to it.
⌘ + option + K	Creates a slideshow and adds a button to link to it.
⌘ + option + T	Creates a track and adds a button to link to it.
Press Command-Option and drag button's edge.	Sets button navigation when you drag from a button's edge to another button.
⌘ + shift + D	Performs a one-time Auto Assign button navigation pass.
⌘ + shift + B	Sends the selected item to the back.
⌘ + [	Sends the selected item backward one step in priority.
⌘ +]	Brings the selected item forward one step in priority.

Keyboard shortcut	Function
⌘ + shift + F	Brings the selected item to the front.
Press Shift and drag.	Constrains the movement of an item to the vertical or horizontal direction only.
Press Shift-Option and drag.	Duplicates the selected item and constrains its movement to the vertical or horizontal direction only. You must wait to press Shift until you have started dragging the item.
Press Command and drag item.	Moves the selected item without snapping or showing the dynamic guides.
Drag button's edge to resize and press Option.	Changes the item size based on its center. (You must wait to press the Option key until after you start dragging.)
⌘ + R	Shows or hides rulers.
⌘ + ;	Shows or hides alignment guides.
W	Toggles the button state through normal, selected, and activated.
Q	Toggles the background view through background only, overlay only, and composite.
P	Toggles the pixel display between square and rectangular.
⌘ + shift + E	Shows and hides the title safe area.
⌘ + option + E	Shows the action safe area.
space	Toggles menu motion on and off.
⌘ + J	Toggles menu motion on and off.

Outline Tab

Keyboard shortcut	Function
Press Option and click track disclosure triangle.	Opens all disclosure triangles in the track area.
⌘ + A	Selects all items.
⌘ + shift + A	Deselects all items.
⌘ + D	Duplicates the selected item.

Palette

Keyboard shortcut	Function
delete	In a media tab, removes the selected folder from the list.
delete	In a Template, Style, or Shape tab, deletes the selected item from your system's hard disk.
⌘ + A	Selects all items in the current view.
⌘ + shift + A	Deselects all items in the current view.
return	Applies the selected item to the menu (templates, styles, and shapes, if applicable).
Double-click.	Applies the selected item to the menu (templates, styles, and shapes, if applicable).
Press Command and drag.	Does the opposite of the "Find matching audio when dragging" preference, used when you drag a video asset to a project element. You must start dragging the video asset before pressing the Command key.

Script Tab (Script Editor)

Keyboard shortcut	Function
⌘ + shift + +	Inserts a new command line.
⌘ + =	Adds a new command line to the end of the script.
delete	Deletes the current command line.
⌘ + A	Selects all command lines.

Simulator

Keyboard shortcut	Function
↑	Provides the up navigation arrow function.
↓	Provides the down navigation arrow function.
←	Provides the left navigation arrow function.
→	Provides the right navigation arrow function.

Keyboard shortcut	Function
return	Activates the selected button.
shift + ?	Shows or hides the information drawer on the left/right edges.
shift + option + ?	Shows or hides the information drawer on the top/bottom edges.
⌘ + W	Closes the Simulator.

Slideshow Tab (Slideshow Editor)

Keyboard shortcut	Function
⌘ + =	Shows large thumbnails.
⌘ + -	Shows small thumbnails.
⌘ + A	Selects all slides.
space	Plays slideshow in Viewer tab or, if playing, stops and returns to the slide it started from.
K	Plays slideshow in Viewer tab or, if playing, stops and returns to the slide it started from.
L	Plays slideshow in Viewer tab, or if playing, pauses playback.

Story Tab (Story Editor)

Keyboard shortcut	Function
⌘ + A	Selects all markers in the list.
space	Plays story in Viewer tab or, if playing, stops and returns to the story entry it started from.
K	Plays story in Viewer tab or, if playing, stops and returns to the story entry it started from.
L	Plays story in Viewer tab, or if playing, pauses playback.

Subtitle Editor

Keyboard shortcut	Function
Press Return while typing text.	Creates a new line.

Keyboard shortcut	Function
Press Enter while typing text.	While typing text into the Subtitle Editor, exits subtitle text entry mode. While typing text in the Subtitle Inspector, creates a new line.
Drag.	Creates a button.
Press Option and drag.	Duplicates the selected button.
option + D	Duplicates the selected button.
Press Command and drag.	Selects multiple buttons.
⌘ + →	Selects the next subtitle.
⌘ + ←	Selects the previous subtitle.
Press Command-Option and drag button's edge.	Sets button navigation when you drag from a button's edge to another button.
Press Option and drag button's edge to resize.	Changes the button size based on its center. (You must wait to press the Option key until after you start dragging.)
Press Command-A while editing text.	Selects all of the text.
⌘ + B	Applies a bold attribute to the selected text.
⌘ + I	Applies an italic attribute to the selected text.
⌘ + U	Adds an underline to the selected text.
⌘ + shift + {	Left aligns the selected text.
⌘ + shift + |	Center aligns the selected text.
⌘ + shift + }	Right aligns the selected text.

Track Tab (Track Editor)

Keyboard shortcut	Function
space	Plays track in Viewer tab or, if playing, stops or pauses playback (depending on the "Space bar toggles between play/pause" setting in DVD Studio Pro Preferences). If you hold down the Space bar, playing automatically stops or pauses when you release it.
L	Plays track in Viewer tab or, if playing, pauses playback.

Keyboard shortcut	Function
K	Stops playback and moves the playhead to where it started.
home	Moves the playhead to the beginning of the timeline.
⌘ + ←	Moves the playhead to the beginning of the selected clip.
option + E	Moves the playhead to the beginning of the selected clip.
→	Moves the playhead forward one frame.
←	Moves the playhead backward one frame.
end	Moves the playhead to the end of the timeline.
⌘ + →	Moves the playhead to the end of the selected clip.
shift + E	Moves the playhead to the end of the selected clip.
shift + ←	Moves the playhead one second earlier.
shift + →	Moves the playhead one second later.
control + ←	Moves the playhead to the previous marker.
option + M	Moves the playhead to the previous marker.
control + →	Moves the playhead to the next marker.
shift + M	Moves the playhead to the next marker.
option + ←	Moves the playhead to the previous GOP.
option + →	Moves the playhead to the next GOP.
⌘ + A	Selects all clips in a stream.
Drag.	Moves the clip in the stream or to another stream.
Press Option and drag.	Creates a duplicate of the clip that can be placed in this or another stream.
Press Shift-Option and drag.	Creates a duplicate of the clip that can only be placed in another stream at exactly the same time or in any suitable place on the current stream.
↑	Jumps playhead forward to next timeline event (marker, clip edge, and so on).

Keyboard shortcut	Function
↓	Jumps playhead backward to next timeline event (marker, clip edge, and so on).
shift + Z	Zooms the Track Editor timeline out to its maximum.
shift + option + Z	Fits current clip to the Track Editor.
shift + T	Toggles through stream height settings.
⌘ + =	Zooms the timeline in on the Track Editor, scrolling to show the playhead if necessary.
⌘ + -	Zooms the timeline out on the Track Editor, scrolling to show the playhead if necessary.
⌘ + shift + +	Zooms the timeline in on the Track Editor, ignoring the playhead position.
⌘ + shift + —	Zooms the timeline out on the Track Editor, ignoring the playhead position.
shift + F4	Locks or unlocks all streams.
M	Creates a marker.
Single-click above timeline.	Creates a marker.
Press M while playing.	Creates a marker on the fly.
delete	Removes the selected clip from the timeline.
Double-click in subtitle stream.	Adds a subtitle clip.
shift + ~	Adds a subtitle at the playhead.

Viewer Tab

The Viewer tab keyboard shortcuts apply to those tabs in which an asset can play. These include the Assets, Track, Story, and Slideshow tabs.

Keyboard shortcut	Function
space	Plays the video asset or, if playing, stops or pauses playback (depending on the "Space bar toggles between play/pause" setting in DVD Studio Pro Preferences). If you hold down the Space bar, playing automatically stops or pauses when you release it.
L	Plays the video asset or, if playing, pauses playback.

Keyboard shortcut	Function
K	Stop.
→	Frame step forward, or with slideshows, advance to the next slide.
shift + →	Step one second forward (not applicable with slideshows).
←	Frame step backward, or with slideshows, go back to the previous slide.
shift + ←	Step one second backward (not applicable with slideshows).

Importing Other Projects

B

Appendix

Using DVD Studio Pro 4, you can import projects created with earlier versions of DVD Studio Pro.

This appendix covers the following:

- Importing DVD Studio Pro 2 and DVD Studio Pro 3 Projects into DVD Studio Pro 4 (p. 633)

Importing DVD Studio Pro 2 and DVD Studio Pro 3 Projects into DVD Studio Pro 4

There are several issues you should be aware of if you are importing projects created in DVD Studio Pro 2 and DVD Studio Pro 3 into DVD Studio Pro 4. These issues are discussed in the following sections:

- Opening Old Projects
- Importing Item Descriptions
- Menu and Subtitle Text May Change
- DVD Studio Pro 3 Projects Using Custom Transitions That Have Been Moved May Not Work

Note: DVD Studio Pro 4 cannot import projects from DVD Studio Pro 1.

Opening Old Projects

When you open a project created in DVD Studio Pro 2 or DVD Studio Pro 3 in DVD Studio Pro 4, a warning appears saying that when you save the project, you will no longer be able to open it in DVD Studio Pro 2 or DVD Studio Pro 3.

DVD Studio Pro 4 has improved the way text items in menus are handled, which may cause some menus to look slightly different.

Importing Item Descriptions

You cannot import item descriptions saved with any earlier version of DVD Studio Pro (1, 2, or 3) into DVD Studio Pro 4. Because an item description is a text file describing an element such as a menu or track, you can create a new item description by importing a project that contains the element into DVD Studio Pro 4, then saving an item description of it.

Menu and Subtitle Text May Change

When you open a project created in DVD Studio Pro 2 or DVD Studio Pro 3 that contains text typed onto a menu or subtitle within DVD Studio Pro, that text may appear different. DVD Studio Pro 4 correctly processes the text for both 4:3 and 16:9 aspect ratios, and for both NTSC and PAL resolutions.

Additionally, if the project contains rotated menu text items, the rotated items may appear different. DVD Studio Pro 4 now correctly rotates menu text items without distorting them.

DVD Studio Pro 3 Projects Using Custom Transitions That Have Been Moved May Not Work

Projects created with DVD Studio Pro 3 that use custom Alpha Transitions may not build correctly if the transitions have been moved. (When you play the VIDEO_TS files, the transition is skipped.) You can correct this by choosing a different transition, then choosing the correct transition again everywhere the transition is used.

Calculating Disc Space Requirements

C

Appendix

A major concern when authoring your DVD project is knowing whether it will fit on the disc size you intend to use. The following describes in detail how to determine the amount of disc space your project requires, and provides a way to determine a safe bit rate to encode your video assets with.

Note: The following example is specific to an SD project on a red laser disc. The same process applies to HD projects on blue laser discs.

Also see Making Sure Your Content Will Fit for additional information on fitting your content to the disc.

This appendix covers the following:

- Calculating a Project's Disc Space Requirements (p. 635)
- Using the Calculated Bit Rate (p. 640)

Calculating a Project's Disc Space Requirements

While the video bit rate is the single biggest factor in controlling the size of your project, a number of other factors determine how much disc space will be required to hold your project:

- The number of and types of audio assets
- The number of slideshows and their audio
- The number of subtitles
- Any DVD-ROM content to be included

The steps below guide you through the process of estimating your project's disc space requirements. For this example, the project has:

- Video asset 1 with a duration of 01:26:13:12 and two audio streams: an AC-3 5.1 surround and an AC-3 stereo
- Video asset 2 with a duration of 00:45:34:07 and one PCM 16-bit 48 kHz audio stream

- Motion menu video with a duration of 00:00:16:20 and one AC-3 stereo audio stream

- Stage 1: Calculating the Total Video Play Time
- Stage 2: Calculating Disc Capacities
- Stage 3: Calculating the Bit Rates for Each Disc Size
- Stage 4: Calculating the Audio Allowances
- Stage 5: Calculating the Effect of Audio on the Video Bit Rate
- Stage 6: Calculating DVD-ROM Allowances
- Stage 7: Calculating Other Allowances

Stage 1: Calculating the Total Video Play Time

You first need to determine the total play time of all video assets and motion menus in your project. To make calculations easier, you need to convert the time from hours, minutes, and seconds to the total number of seconds. For frames, round up to the next second when there are frames left over.

In the example above, video asset 1 is 5174 seconds long, video asset 2 is 2735 seconds long, and the motion menu contains 17 seconds of assets, for a total of 7926 seconds.

Note: Slideshows do not count as video play time, and are discussed later.

Stage 2: Calculating Disc Capacities

To calculate the appropriate bit rate for your content, you need to know each disc type's capacity in bits. The capacity of a DVD-5 disc is 4.7 GB (or 4.37 binary gigabytes). For the purposes of this calculation, you should use the 4.7 GB value because it does not have to be corrected to account for the difference that counting in binary adds. To make the calculation, you multiply the byte capacity by 8 (the number of bits in a byte).

DVD name	Byte capacity	Bit capacity
DVD-1	1.46 GB	11.68 gigabits (Gbit)
DVD-2	2.66 GB	21.28 Gbit
DVD-3	2.92 GB	23.36 Gbit
DVD-4	5.32 GB	42.56 Gbit
DVD-5	4.7 GB	37.6 Gbit
DVD-9	8.54 GB	68.32 Gbit
DVD-10	9.4 GB	75.2 Gbit
DVD-14	13.24 GB	105.92 Gbit
DVD-18	17.08 GB	136.64 Gbit

Stage 3: Calculating the Bit Rates for Each Disc Size

Once you know the play time in seconds and the bit capacity of the different disc sizes, you can calculate a basic bit rate for each disc size. To do this, divide the disc size by the play time (7926 seconds in this example).

DVD name	Bit capacity	Bit rate
DVD-1	11.68 gigabits (Gbit)	1.47 megabits per second (Mbps)
DVD-2	21.28 Gbit	2.68 Mbps
DVD-3	23.36 Gbit	2.95 Mbps
DVD-4	42.56 Gbit	5.37 Mbps
DVD-5	37.6 Gbit	4.74 Mbps
DVD-9	68.32 Gbit	8.62 Mbps
DVD-10	75.2 Gbit	9.49 Mbps
DVD-14	105.92 Gbit	13.36 Mbps
DVD-18	136.64 Gbit	17.24 Mbps

These bit rate values should not be considered final at this point because you still have to take into consideration the audio and DVD-ROM content. However, these values do provide an indication as to which DVD disc size you will need to use. If your project uses compressed audio, such as the Dolby Digital AC-3 format, and has little or no DVD-ROM content, you would need to decide whether encoding at 4.74 Mbps (or slightly less to ensure the video and audio all fit on the disc) would provide satisfactory results. If so, a DVD-5 disc should work for this project. If the project includes multiple soundtracks, a lot of slides or subtitles, and some DVD-ROM content, you may decide it is best to use a DVD-9 disc size so that everything you want to include will fit on the disc.

Another point to keep in mind is that video assets are not required to use the same bit rate. For some assets, you may decide that quality is not as important as it is for others, and choose to use a lower bit rate for them, allowing more disc space for the other video assets.

Choosing a bit rate that provides satisfactory results depends on the video content and the encoder you use. In general, bit rates below 4.0 Mbps are marginally acceptable. For bit rates between 4 and 6 Mbps, you should get good results when using a good variable bit rate (VBR) encoder, such as the integrated MPEG encoder, or, for more options, Compressor directly. For rates between 6 and 8 Mbps, you should have no trouble getting good results even when using a constant bit rate (CBR) encoder. Eight Mbps is usually considered the highest usable bit rate—the DVD specification allows up to 9.8 Mbps, but this can cause playback problems on some DVD players and limit your audio options.

For more information on encoding, see Encoding Video Materials for DVD.

Stage 4: Calculating the Audio Allowances

Depending on your project, the audio may have a relatively minor effect on disc space. It can also be challenging to determine the audio allowances because each video asset can have up to eight audio streams, and each stream can be a different type and length. The following table lists the typical bit rates for the common audio formats.

Audio format	Bit rate
AC-3 stereo	192 kilobits per second (kbps) to 224 kbps
AC-3 5.1 surround	384 to 448 kbps
DTS 5.1 surround	754.5 kbps or 1509.75 kbps
PCM stereo 16 bits at 48 kHz	1536 kbps
PCM stereo 24 bits at 96 kHz	4608 kbps

In the earlier example, video asset 1 has two audio streams, each 5174 seconds long. The first stream is AC-3 5.1 surround, and the second is AC-3 stereo. The video asset 2 has one audio stream 2735 seconds long, using 16-bit 48 kHz PCM audio. The motion menu has an AC-3 stereo audio stream 17 seconds long. If your slideshow includes audio, you also need to include that in the formula.

To calculate the storage required, you determine each video asset's total audio bit rate and multiply that by the duration.

Section	Duration	Bit rate	Disc space
Video 1, AC-3 5.1	5174 seconds	448 kbps	2.32 gigabits (Gbit)
Video 1, AC-3 stereo	5174 seconds	224 kbps	1.16 Gbit
Video 2, 16-bit 48 kHz PCM	2735 seconds	1536 kbps	4.20 Gbit
Menu, AC-3 stereo	17 seconds	224 kbps	0.004 Gbit
			Total: 7.684 Gbit

As you can see, using PCM audio requires substantially more disc space than using a compressed format like AC-3. See Preparing Audio Assets for more information on the different audio formats.

Stage 5: Calculating the Effect of Audio on the Video Bit Rate

Now that you know how much disc space is required for the audio, you can more accurately determine the video bit rate you can use. Because the DVD-5 and DVD-9 discs were the only practical ones based on the previous calculations, you will continue experimenting with them in this example.

For the DVD-5 disc, you need to subtract the total audio amount from the total disc size: 37.6 gigabits – 7.684 gigabits = 29.916 gigabits for the video. Dividing the available space by the video duration provides a new bit rate: 29.916 gigabits ÷ 7926 = 3.77 Mbps. You can see that the audio has considerably affected the original bit rate for the DVD-5 disc (4.74 Mbps). The use of PCM audio for the second video asset in this example has forced the video bit rate to drop below 4 Mbps, making the use of a DVD-5 disc questionable because a bit rate that low may not provide suitable quality.

For the DVD-9 disc, you end up with 60.636 gigabits available for the video (68.32 gigabits – 7.684 gigabits). The adjusted video bit rate is now 7.65 Mbps (60.636 gigabits ÷ 7926 seconds)—easily high enough to provide good quality.

Stage 6: Calculating DVD-ROM Allowances

If you intend to include DVD-ROM content on the disc, you need to subtract it from the disc space before coming up with your video bit rate.

Because the size of your DVD-ROM content is expressed in binary megabytes, you must convert it to the same standard as used for the DVD disc size. In this example, there is a total of 36 MB of data. Each computer MB is equal to 1,048,576 actual bytes. To convert the DVD-ROM content, you need to multiply its size (36 MB) by 1,048,576 to get the actual size of 37,748,736.

The next step is to convert this number into bits by multiplying it by 8, providing a final size of approximately 0.3 gigabits. While this is not a large amount of space, you should take it into account if you are trying to maximize usage of the disc's available space.

Stage 7: Calculating Other Allowances

There are several other factors that should be taken into account when determining available disc space.

- *Slideshows:* Each still in a slideshow requires approximately 200 kilobytes (KB) of disc space. A full slideshow with 99 stills requires about 20 MB of disc space. If the slideshow contains audio, you will find that the audio can require as much or more disc space than the stills. If your disc contains many stills, you will need to take them into account.
- *Still menus:* Each standard still menu requires about 300 KB of space, depending on the number of buttons.

  Layered menus can require a lot more space than standard menus because a new menu is created for each button in each of its separately specified states (normal, selected, and activated). This can mean as many as 12 menus are created to support 4 buttons. See Creating Menus Using the Layered Method for more information on layered menus.

  Note: Menus that use button shapes with motion assets assigned are considered to be motion menus, and need to count as a video asset.

- *Subtitles:* The amount of space required by subtitles can vary widely, depending on how many of the 32 streams you use, the type of content you use (simple text characters or full-screen graphics), and how often you change them (several times a second, or more typically, once every four or five seconds).

  Simple subtitles average about 10 kbps—roughly 2 megabits of space per hour, which is negligible on most titles. If you intend to use subtitles more as an animation tool, with full-screen graphics that change often, you must make significant allowances for them. (The maximum bit rate allowed for a subtitle stream is 3.36 Mbps—almost as much as the video stream.)

- *Transitions:* The amount of disc space required by each transition varies depending on the transition's length and type. In general, for SD projects, which use a bit rate of 6 Mbps for transitions, you should allow 750 KB of disc space for every second of transition time in the project. For HD projects, which use a bit rate of 20 Mbps for transitions, you should allow 2.5 MB of disc space per second.

  Note: Keep in mind that adding a transition to a menu results in a separate transition clip for each button—a menu with 18 buttons can require 18 transition clips.

Unless you are using an exceptional number of stills, menus, or subtitles, you can usually account for the amount of space required by these items by allowing a five percent overhead. The easy way to apply this overhead amount is to multiply the bit rate you have figured out by 0.95. In the earlier example, the DVD-5 disc bit rate drops from 3.77 Mbps to 3.58 Mbps; the DVD-9 bit rate drops from 7.65 Mbps to 7.27 Mbps.

Important: It is much better to be conservative and find yourself with some disc space left over than to get to the end of the project and find it will not fit on the disc.

Using the Calculated Bit Rate

The bit rates you calculate can be used as the bit rate entry of your encoder, regardless of the encoding method you intend to use (one pass, one-pass variable bit rate [VBR], or two-pass VBR). See MPEG Encoding Methods for more information.

Transition Parameters

D

Appendix

Most of the parameters of the standard transitions supplied with DVD Studio Pro are self-explanatory. However, some parameters are not as obvious. This appendix explains the parameters for each of the transitions. For details on using transitions with menus, see Using the Menu Transition Feature. For details on using transitions with tracks, see Adding Transitions to Still Clips. For details on using transitions with slideshows, see Using Slideshow Transitions.

This appendix covers the following:

- Transition Duration (p. 641)
- Video Transition (p. 641)
- Alpha Transitions (p. 642)
- Standard Transitions (p. 642)

Transition Duration

All transitions have a duration setting. The duration can be set from a minimum defined for each transition (usually one second) to a maximum based on the source length or 10 seconds maximum, whichever is smaller. For example, a slide with a duration of 5:00 can have a maximum transition duration of 4:15 because the minimum duration for a slide is 15 frames. (This is in an NTSC project—in a PAL project, the maximum transition duration would be 4:13 because the minimum duration for a slide is 12 frames.)

Video Transition

Menus and buttons have an additional transition to choose called Video Transition. With Video Transition, you choose a video asset to play as the transition when a button is pressed.

Alpha Transitions

DVD Studio Pro includes several Alpha Transitions. These transitions use short video clips to produce a transition from the current picture to the new picture. These transitions, indicated with the Greek letter alpha in front of their name, have no settings other than a duration, and are not listed with the standard transitions.

Additionally, you can even create and import your own Alpha Transitions. See Preparing Alpha Transitions for details on the process.

Standard Transitions

The following sections contain details about the standard transitions available in menus, tracks, and slideshows.

Blur

Blurs the current picture while it fades, revealing the new picture underneath.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Blur	Soft or Intense	Defines the amount of blur shown before the transition finishes.

Cube

Rotates the current picture off the screen while revealing the new picture as if on an adjacent side of a rotating cube.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the cube rotates in.
Field of View	0–10	Defines the amount of perspective, with 0 being maximum and 10 being minimum.
Background	Color	Defines the color that appears in areas the pictures do not cover.

Dissolve

Dissolves between the current and new pictures.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.

Drop

Slides in the new picture over the current one, with a bounce as it "hits" the side. Use Move In to have the slide without the bounce.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the new picture moves in.

Droplet

The current picture ripples from its center and fades away, revealing the new picture.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Amplitude	0–10	Defines the severity of the ripple before the transition finishes; 0 is subtle while 10 is extreme.

Fade Through Color

Dissolves from the current picture to a color, then to the new picture.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Color	Color	Defines the color dissolved to.

Flip

Rotates the current picture in 3D space, revealing the new picture on its back.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the current image rotates toward.
Background	Color	Defines the color that appears in areas the pictures do not cover.
Field of View	0–10	Defines the amount of perspective, with 0 being maximum and 10 being minimum.

Melt

"Melts" the current picture while it fades, revealing the new picture.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Viscosity	0-10	Defines how far the picture melts before the transition finishes.

Mosaic

Divides the picture into panels that each flip independently to reveal the new picture on their back.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the current image panels rotate toward.
Rows	1–16	Defines the number of rows the picture is broken into.
Columns	1–16	Defines the number of columns the picture is broken into.
Field of View	0–10	Defines the amount of perspective, with 0 being maximum and 10 being minimum.

Motion Dissolve

Current picture zooms out while it dissolves to the next picture.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.

Move In

Slides in the new picture over the current picture. Use Drop to have the slide with a bounce as it “hits” the side.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the new picture moves in.

Page Flip

Creates a page turn effect to remove the current picture, revealing the new picture underneath.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the page is turned to.
Angle	0–359 degrees	Defines the amount the page flip's fold rotates during the transition.
Field of View	0–10	Defines the tightness of the fold, with 0 being minimum and 10 being maximum.

Push

Current picture slides off as the new picture slides in.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the new picture moves in.

Radial Blur

Current picture blurs and zooms out while fading to reveal the new picture.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Depth	0–10	Defines the amount of blur and zoom before the transition finishes, with 0 being minimum and 10 being maximum.

Reveal

Current picture slides off, revealing the new picture sitting underneath it.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the current picture moves in.

Rotate

Spins the current picture about its Z-axis while zooming out and fading to reveal the new picture underneath.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Depth	0–10	Defines the amount of rotation and zoom before the transition finishes, with 0 being minimum and 10 being maximum.

Rotation Blur

Spins the current picture about its Z-axis while blurring, zooming out, and fading to reveal the new picture underneath.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Angle	0–359 degrees	Controls how far the current picture rotates during the transition.

Wipe

Current picture is wiped off and the new picture wiped on using a straight edge soft wipe.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Direction	Right, left, up, and down	Defines the direction the wipe moves in.
Thickness	0–10	Defines the softness of the wipe edge, with 0 being minimum and 10 being maximum.

Zoom

Current picture zooms out and fades to reveal the new picture.

Parameter name	Range	Notes
Duration	1 to 10 seconds	You can enter a duration or drag the slider to set the duration.
Depth	0–10	Defines the amount of zooming before the transition finishes, with 0 being minimum and 10 being maximum.

Glossary

4:3 The most common video aspect ratio, used for NTSC and PAL video standards. Also known as the *1.33* aspect ratio. See also aspect ratio.

16:9 The widescreen aspect ratio supported by the DVD-Video specification. Also known as the *1.78* aspect ratio. See also anamorphic, aspect ratio.

AC-3 audio A compressed audio format developed by Dolby Laboratories. Also known as *Dolby Digital* audio. Supports single-channel through 5.1 surround sound configurations. The AC-3 encoder in Compressor outputs AC-3 format audio.

active area The rectangular area that defines the part of the overlay graphic used for a button. Also defines a buttons hot spot that can be clicked when viewing the title on a computer. See also button.

anamorphic A type of widescreen video in which the video uses the same frame size as standard 4:3 video, but with a horizontally compressed image, giving it a distorted appearance. Widescreen SD-based DVDs require you to use anamorphic 16:9 video.

aspect ratio A video frames width-to-height ratio on your viewing screen. The most common aspect ratio is 4:3 used for standard video. The DVD specification also supports the 16:9 aspect ratio. See also 4:3, 16:9, anamorphic.

assets The audio, video, and still image files used by DVD Studio Pro in authoring DVD projects.

AUDIO_TS folder One of two folders required on standard definition DVD-Video discs (the VIDEO_TS folder is the other). The AUDIO_TS folder is reserved for use on DVD-Audio titles, and is always created but left empty when building projects with DVD Studio Pro. See also VIDEO_TS folder.

authoring The process of creating a DVD. Authoring a DVD project requires you to use your sources to create elements, such as menus and tracks, connect the elements so that the viewer can get from one to the other, and then format the project into a DVD-compliant set of files, image, or DVD. See also elements.

authoring media The DVD-R format that supports the Cutting Master Format (CMF) for adding advanced features to master discs supplied to a replication facility. Requires using a special authoring DVD-R drive. See also Cutting Master Format (CMF), general media.

AVC (Advanced Video Codec) See H.264.

background image All menus have a background image, over which the menu's buttons are placed. The background can be a still image or a motion video (creating a *motion menu*). See also motion menu.

B-frame Bi-directional frame. In an MPEG video stream, a B-frame contains the motion differences between I-frames and P-frames occurring before and after it. With respect to file sizes, these are the most efficient frame types, although they have the greatest difficulty in handling abrupt scene changes. See also Group of Pictures (GOP), I-frame, P-frame.

bit rate The number of bits per second that makes up a digital video or audio asset. The higher the bit rate, the better the quality. However, higher bit rates require larger file sizes and can cause playback problems if the DVD player is unable to keep up. The DVD specification places bit rate limits on assets used in DVD titles.

blue laser The name for the new disc format supported by HD-based DVDs. The name refers to the color of the laser that plays the discs. Because a blue laser has a shorter wavelength than the red laser used with traditional SD-based DVDs, it is able to handle data that is more tightly packed than on red laser discs. This results in a little more than three times higher disc capacity. See also red laser.

build To compile the project into its DVD-compliant format, creating the AUDIO_TS and VIDEO_TS folders for SD projects, and the HVDVD_TS folder for HD projects. The streams that make up a track are *multiplexed* into a single video object file. See also format.

burn To write data to a disc. Within DVD Studio Pro, *burn* refers to a process that builds the project and then formats and writes it to a DVD-R, simplifying the process. See also build, format.

button Each DVD menu has at least one button that the viewer can activate to access areas within the DVD. You can also place buttons over a video track. DVD Studio Pro supports three button types: overlay-based using an overlay graphic, shape-based using supplied or custom shape graphics, and layer-based using layers in an Adobe Photoshop (PSD) format file. You can connect buttons to a wide variety of project elements, including buttons on other menus, tracks, stories, slideshows, and scripts. See also button navigation, button states, motion button.

button navigation The actions that occur when a viewer presses a remote control's arrow buttons. You can manually configure each button's navigation settings or use the DVD Studio Pro Auto Assign feature to automatically set the navigation of all buttons on a menu at once. It is important to set the navigation so that viewers can logically get from the current button to the desired one.

buttons over video Interactive buttons that appear over a video stream by way of a subtitle stream. Used to provide the viewer with viewing options while watching a title's main program. Also known as *interactive subtitles* and *interactive markers*.

button states Each button on a menu can be in one of three states: normal, selected, and activated. In the normal state, the button displays its inactive condition. All buttons on a menu except one are in the normal state. A button is selected when the viewer navigates to it. Only one button at a time can be in the selected state. The selected button becomes activated when the viewer presses the remote control's Enter button. Depending on the button type, highlights or layers are used to indicate each button's state.

chapter Places in a track where you can connect to. Commonly used to identify scenes for a chapter index menu. You can assign up to 99 chapters in each track.

clip The term used to describe a video or audio asset, especially after it has been added to a track. See also assets.

color mapping When working with overlay graphics, the process of assigning a color and opacity setting to colors used in the overlay graphic. You assign separate colors and opacities for all three button states (normal, selected, and advanced). See also overlay.

compile See build.

constant bit rate (CBR) encoding A video MPEG encoding method that uses the same bit rate for the entire video file. Its primary advantage is that you can reliably predict the resulting file size. Its disadvantage is that all video scenes, whether still or with a lot of motion, are treated the same. See also variable bit rate (VBR) encoding.

Content Scrambling System (CSS) Provides digital-based copyright protection for an SD DVD's contents. See also Copy Generation Management System (CGMS), Macrovision.

Copy Generation Management System (CGMS) Used to set whether an SD DVD can have unlimited copies made, a single copy made, or no copies made. Allowing no copies to be made activates the CSS and Macrovision settings. See also Content Scrambling System (CSS), Macrovision.

Cutting Master Format (CMF) A format that provides the information needed by replication facilities to add advanced features to a DVD, such as support for copy protection and dual-layer discs. The cutting master format can be applied to DLTs and authoring DVD-Rs, but not general DVD-Rs.

Digital Linear Tape (DLT) drive The tape drive most often used to supply an SD DVD project to a replication facility. A separate tape is written for each project layer during the format process. See also disc description protocol (DDP), format.

Digital Theatre Systems (DTS) audio A compressed audio format for single channel through 5.1 surround sound configurations. Requires an external DTS decoder for playing on your computer.

disc description protocol (DDP) The file type most often used when formatting a project onto a DLT drive. See also Digital Linear Tape (DLT) drive.

Dolby Digital See AC-3 audio.

double-layer disc A recordable disc format that you can burn a dual-layer project to. Because it has the same capacity as a dual-layer disc, it is able to use the dual-layer settings in your project to place the break point, making it possible to test the project before sending it to the replicator. See also dual-layer disc.

double-sided disc A DVD with content on both sides of the disc. Most DVD players require you to turn the disc over to play the second side. Each side can be single- or dual-layer. See also dual-layer disc.

drop frame timecode Timecode that represents the actual time duration of NTSC at 29.97 frames per second (fps). To achieve this accuracy in numbering the frames, two frame numbers are dropped every minute on the minute, except for the tenth minute. See also non-drop frame timecode, timecode.

drop zone An element you can add to a menus background. You can assign a still image or moving video asset to the drop zone. You can size, position, and rotate the drop zone. When you build the title, the drop zone is merged with the background. Drop zones cannot be linked to other elements in the project.

dual-layer disc A DVD with two layers on a single disc side, almost doubling a single-layer disc's capacity. While you can burn a dual-layer project on a double-layer drive, they are most often created by a replication facility. See also double-layer disc, double-sided disc, opposite track path (OTP), parallel track path (PTP).

duplication facility When you need to create multiple copies of a DVD, and the disc fits on a standard DVD-R and requires no special high-end features such as copy protection, you can use a duplication facility. The duplication process creates DVD-R copies from a DVD-R that you burn on your system; they can automate the process and add professional labels. See also replication facility.

DVD@CCESS A feature in DVD Studio Pro that allows you to add additional interactivity to your title when it is played on a computer. With DVD@CCESS, you can add links to menus, tracks, and markers that can be used to open an application on the computer to display extra content. For example, you can open the system's web browser and direct it to a specific URL.

DVD-R The DVD format supported by the Apple SuperDrive, using write-once discs. See also authoring media, Cutting Master Format (CMF), general media.

DVD-ROM A DVD with files in addition to those included on a standard DVD-Video disc. These files can be accessed when the title is played on a computer—they are ignored by standard set-top DVD players. The files can be almost anything you can write to a disc such as additional graphics or software.

elements The parts of a DVD project, such as menus, tracks, stories, slideshows, and scripts. Authoring a project involves creating the elements and connecting them together. See also authoring.

encoding The process of converting video or audio to a different format. For DVD projects, this means converting the video to an MPEG-2 file, and the audio to one of several DVD-compliant formats.

First Play The element of a project that appears when the title begins playing. You can assign any of your projects elements as the First Play.

format The process of writing the build files to an output device, which can be a DVD-R drive, an DLT drive, or your system's hard disk. See also build.

general media The DVD-R format most commonly used by DVD-R drives, including the Apple SuperDrive. It does not support the Cutting Master Format (CMF). See also authoring media, Cutting Master Format (CMF).

General Purpose Register Memories (GPRMs) DVD players contain memory registers that are set aside for use by DVDs while they play. Scripts in a DVD use the GPRMs to store values used to provide special playback features, such as language customization or random playback. See also System Parameter Register Memories (SPRMs).

Group of Pictures (GOP) A small section of an MPEG-2 encoded video clip, built from one I-frame and several B-frames and P-frames. Typical GOP sizes range from a few frames to a maximum of 18 frames (NTSC) or 15 frames (PAL). Marker placement and video trims can only occur at GOP boundaries. See also B-frame, I-frame, P-frame.

H.264 Based on the MPEG-4 part 10 format, the H.264 format, the H.264 video format, also known as Advanced Video Codec (AVC), provides for encoding with about twice the efficiency as with the MPEG-2 format. This results in better quality at the same bit rate, or you can choose to use a lower bit rate to achieve the same quality (with a smaller file size). In DVD Studio Pro, the H.264 format can only be used with HD projects.

HDV An HD video format, using high bit rate MPEG-2 encoding, designed to be recorded on standard mini-DV tapes. HDV video can be edited in Final Cut Pro 5 and used in your HD projects without ever needing to be transcoded.

HVDVD_TS The folder required on HD DVD-Video discs. DVD Studio Pro creates the HVDVD_TS folder when you build your HD project. It contains all of the video, audio, subtitle, menu, and navigation files that make up your HD DVD-Video title.

I-frame Intra frame. In an MPEG video stream, I-frames, also known as *reference* or *key* frames, contain the complete image of the current frame. Unlike B-frames and P-frames, I-frames do not rely on other frames to provide image information. Each GOP contains one I-frame. See also B-frame, Group of Pictures (GOP), P-frame.

interactive markers See buttons over video.

interactive subtitles See buttons over video.

jacket picture An optional part of the DVD-Video specification that is intended to allow a DVD player to display a graphic representing a DVD, either on a separate display or when the DVD player is stopped.

layered menu creation method A method of creating menus that takes advantage of a Photoshop PSD file having separate layers for each button in its three states (normal, selected, and activated). This allows you to use complex graphics for the button highlights; however, you cannot include a motion video background or audio. See also button states, standard menu creation method.

letterbox A method of displaying 16:9 video on a 4:3 monitor. The entire frame appears, with black bars at the top and bottom. See also pan-scan.

Line 21 support In NTSC systems, the video line that can contain special data. Most often used to contain closed caption information.

Macrovision Provides analog-based copyright protection for an SD DVD's contents. See also Content Scrambling System (CSS), Copy Generation Management System (CGMS).

marker An element you can add to a track to identify specific parts of the track's content. There are several marker types, including chapter markers used to link chapter buttons and button highlight markers used to control buttons over video. You can have up to 99 chapter markers in a track, and up to 255 total markers in a track. Markers can only be placed at GOP boundaries. See also Group of Pictures (GOP).

menu An element in a project that provides buttons for the purpose of connecting to other elements in your project, such as tracks and slideshows. A menu can have a still or full motion background, and can include audio. See also background image, drop zone, motion button, motion menu.

motion button Button shapes that can display a thumbnail image of an assigned asset. The asset can be a still image or a video clip.

motion menu A menu that contains moving video content, either as the background, a motion button, or a drop zone. See also background image, drop zone, motion button.

MPEG Acronym for *Moving Picture Encoding Group*. A group of encoding standards that define the MPEG-1 and MPEG-2 encoding standards used by DVDs.

multiplexing The process of combining multiple streams, such as video streams, audio streams, and subtitle streams, into a single stream. This occurs when you build your title and create DVD-compatible streams. See also build.

muxing See multiplexing.

non-drop frame timecode Normal NTSC timecode, where frames are numbered sequentially and there are 30 frames per second, 60 seconds per minute, and 60 minutes per hour. Because NTSC's frame rate is actually 29.97 fps, non-drop frame timecode is off by 3 seconds and 18 frames per hour in comparison to actual elapsed time. See also drop frame timecode, timecode.

NTSC Abbreviation for *National Television Standards Committee*. The organization that defines North American broadcast standards. The term *NTSC video* refers to the video standard defined by the committee, which has a specifically limited color gamut, is interlaced, and is approximately 720 x 480 pixels, 29.97 fps. See also PAL.

one-pass and two-pass VBR (variable bit rate) encoding See variable bit rate (VBR) encoding.

opposite track path (OTP) Used when creating dual-layer discs to control where the second layer starts. With OTP, the second layer starts at the outside edge of the disc, which is the opposite of the first layer, which starts at the disc's inside edge. See also dual-layer disc, parallel track path (PTP).

overlay A still graphic that provides the highlight information for buttons when creating menus or buttons over video. Overlays can be simple, using a single color on a white background, or advanced, using up to four predefined colors. You use color mapping to assign highlight colors to those used in the overlay, setting different colors for each button state (normal, selected, and activated). See also color mapping.

PAL Acronym for *Phase Alternating Line*. A 25 fps (720 x 576 pixels) interlaced video format used by many European countries. See also NTSC.

pan-scan A method for displaying 16:9 video on a 4:3 monitor. Content is cropped at each end so that the 4:3 monitor is filled. An MPEG-2 video clip with pan and scan can include vectors that dynamically change the part of the picture that is cropped. See also letterbox.

parallel track path (PTP) Used when creating dual-layer discs to control where the second layer starts. With PTP, the second layer starts at the inside edge of the disc, the same as the first layer. See also dual-layer disc, opposite track path (OTP).

patches Specialized shapes that provide features not normally available with traditional shapes, such as shading and colorization. You cannot create your own patches. See also shapes.

P-frame Predicted frame. In an MPEG video stream, P-frames are encoded based on the closest preceding I-frame or P-frame. They can be referenced by B-frames occurring before or after them. With respect to file size, they are not as efficient as B-frames, but handle abrupt scene changes better. See also B-frame, Group of Pictures (GOP), I-frame.

pixel aspect ratio The distance between a pixel, the one next to it, and the one below it defines its aspect ratio. A square pixel aspect ratio, as used on computer systems and HD video monitors, has the same pixel distance in both directions. SD video monitors do not have the same distance in both directions, and have rectangular pixels. NTSC and PAL video each have different pixel aspect ratios. This difference must be accounted for when creating graphics on a computer for use in an SD project.

project When you author a DVD title with DVD Studio Pro, you create and work in a *project*.

red laser Refers to the color of the laser used to play the discs used by SD projects. See also blue laser.

region codes DVDs can be set to play only in certain parts of the world by selecting the supported regions when you author your title. The DVD specification divides the world into six regions plus an additional region for use by airlines and cruise ships.

replication facility You can use a replication facility when you need to reproduce a significant number of copies of your DVD (generally more than 100). You must use a replication facility if you require dual-layer discs, or if you intend to include high-end features such as copy protection or region codes. Replication facilities use a glass mastering process to create DVDs that are compatible with all DVD players, as opposed to the DVD-R process used by duplication facilities. See also duplication facility.

scripts Simple programs you create to access specialized information from the DVD player, such as its region code, and to perform advanced functions, such as randomly playing all tracks. You can connect most elements of a project to scripts. See also General Purpose Register Memories (GPRMs), System Parameter Register Memories (SPRMs).

shapes Used with standard menus, shapes can be added to a menu as *buttons* or *drop zones*. In addition to their primary graphic, shapes can include the graphics required for highlights and video thumbnails. You can use those supplied with DVD Studio Pro or create your own. See also motion button, patches, standard menu creation method.

slideshow An element in a project that can contain up to 99 still images and accompanying audio. DVD Studio Pro allows you to convert a slideshow into a track so that you can add additional features to it, such as a subtitle or additional languages for the audio.

S/PDIF audio Sony/Philips Digital Interface. Digital audio output used by external AC-3 or DTS decoders to listen to DVD Studio Pro audio.

standard menu creation method In DVD Studio Pro, refers to the process of creating menus that provides the most flexibility, including the ability to use motion video for the background, motion buttons, shapes, drop zones, and audio. Standard menus can also use templates and styles. See also layered menu creation method.

story An element in a project that is specific to a particular track, allowing you to create a customized version of that track. For example, you can use stories to create alternate versions of a track that skip violent content or play just the track's highlights.

styles Used with standard menus, styles define how specific menu items, such as text objects, buttons, and drop zones, work in a menu. You can use those supplied by DVD Studio Pro or create your own. See also standard menu creation method, templates.

subpicture See overlay.

subtitle The DVD specification provides for up to 32 subtitle streams to be included in each track. These streams can contain plain text, similar to a closed caption function. They can also be used to provide buttons over video, allowing you to have buttons appear outside of menus. You can create the subtitles within DVD Studio Pro or import them from outside sources.

System Parameter Register Memories (SPRMs) DVD players contain memory registers that contain configuration information, such as languages, video configuration, and region codes, for use by DVDs while they play. Scripts in the DVD can use the SPRMs to determine which version of a track to play or whether the DVD player has the proper region code. See also General Purpose Register Memories (GPRMs).

templates Used with standard menus, templates can contain styles that define a menu's background, button layout, text, and drop zones. You can use those supplied with DVD Studio Pro or create your own. See also standard menu creation method, styles.

timecode A method of associating each frame of video in a clip with a unique, sequential unit of time. The format is hours: minutes: seconds: frames. See also drop frame timecode, non-drop frame timecode.

track The element of a DVD Studio Pro project that contains the video, audio, and subtitle streams that provide the primary content of the DVD. Each project can have a combination of up to 99 tracks, stories, and slideshows.

transitions A short video clip that plays in place of the normal direct jump from one button or still image to the next element. There are a variety of transition types supplied with DVD Studio Pro that you can use. Transitions can be configured between a menu button and its target, between slides in a slideshow, and between still image clips in a track.

variable bit rate (VBR) encoding A video MPEG encoding method that varies the bit rate based on the video content. Scenes with little motion use low bit rates to reduce the disc space needed, while scenes with a lot of motion use higher bit rates for greater quality. One-pass VBR encoding is faster than two-pass VBR encoding, but its quality is not quite as good and the final file size may be slightly different than you predicted. Two-pass VBR encoding makes a first pass through the video to determine its motion content, and then uses a second pass to perform the encode, with the advantage of better quality and providing a predictable file size.

VIDEO_TS folder One of two folders required on DVD-Video discs (the AUDIO_TS folder is the other). DVD Studio Pro creates the VIDEO_TS folder when you build your SD project. It contains all of the video, audio, subtitle, menu, and navigation files that make up your DVD-Video title.

video title set (VTS) The contents of a DVD are contained in one or more VTS blocks. DVD Studio Pro creates a VTS block for each track and slideshow in your project, with a maximum of 99 total. In addition to a track or slideshow, each VTS can also contain menus and scripts. You can use the VTS Editor to view and manage the VTS structure of your DVD projects.

video zone The area of the DVD that contains the VIDEO_TS or HVDVD_TS folders.